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Agricultural Conservation Program

**HANDBOOK
FOR
1964**

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U. S. DEPARTMENT OF AGRICULTURE

Agricultural Stabilization and Conservation Service

FOREWORD

Productive soil, adequate water, and well-managed woodland are the very foundation of American agriculture. The Agricultural Conservation Program is the means through which all our people, including farmers, share the costs of conserving these essential national resources. This program increases the rate of application of the research, education, technical, credit, and other services of the Department of Agriculture in actual accomplishment of essential conservation work on the land.

Let all farmers, and particularly those not now carrying out sound conservation practices, use the 1964 Agricultural Conservation Program to increase conservation accomplishments on their lands.

THE 1964 AGRICULTURAL CONSERVATION PROGRAM FOR ARKANSAS

Through the 1964 Agricultural Conservation Program, the Federal Government will share with Arkansas farmers the cost of carrying out approved soil-building and soil and water conservation practices, including related wildlife conservation practices, in accordance with the provisions of this handbook and such modifications thereof as may hereafter be made.

Information with respect to the several practices for which costs will be shared when carried out on a particular farm, and the exact specifications and rates of cost-sharing for such practices, may be obtained from the county committee for the county in which the farm is located or from the State Committee.

Section 1—GENERAL PROGRAM PRINCIPLES

The 1964 National Agricultural Conservation Program has been developed and is to be carried out on the basis of the following general principles.

1. The national program contains broad authorities to help meet the varied conservation problems of the Nation. State and county committees and participating agencies shall design a program for each State and county. Such programs should include any additional limitations and restrictions necessary for the maximum conservation accomplishment in the area. The programs should be confined to the conservation practices on which Federal cost sharing is most needed in order to achieve the maximum conservation benefit in the State or county.

2. The State and county programs should be designed to encourage those conservation practices which provide the most enduring conservation benefits practicably attainable in 1964 on the lands where they are to be applied. Preference shall be given to practices that help to establish permanent vegetative cover.

3. Costs will be shared with a farmer or rancher only on satisfactorily performed conservation practices for which Federal cost-sharing was requested by the farmer or rancher before the conservation work was begun.

4. Costs should be shared only on conservation practices which it is believed farmers or ranchers would not carry out to the needed extent without program assistance. In no event should costs be shared on practices except those which are over and above those farmers or ranchers would be compelled to perform in order to secure a crop.

5. The rates of cost-sharing in a county or State are to be the minimum required to result in substantially increased performance of needed conservation practices within the limits prescribed in the national program.

6. The purpose of the program is to help achieve additional conservation on land now in agricultural production rather than to bring more land into agricultural production. The program is not applicable to the development of new or additional farmland by measures such as drainage, irrigation, and land clearing.

7. If the Federal Government shares the cost of conservation practices, the farmers and ranchers should assume responsibility for the upkeep and maintenance of those practices throughout their lifespans.

Section 2—DISTRIBUTION OF FUNDS

The State Committee will allocate the funds available for conservation practices among the counties within the State consistent with the needs for enduring conservation in the counties within the State and will give particular consideration to the furtherance of watershed conservation programs sponsored by local people and organizations.

Section 3—STATE AND COUNTY AGRICULTURAL CONSERVATION PROGRAMS

A. Agencies participating in development of State program.— The State Agricultural Conservation Program was developed by the State ACP Development Group consisting of the State Committee (including the State Director of Extension), the State Conservationist of the Soil Conservation Service, and the Forest Service official having jurisdiction of farm forestry in the State. The Vice President for Agriculture, University of Arkansas, designated representatives who, with the State Director of the Farmers Home Administration, counseled with the group in the formulation of the State program. Representatives of the State Agricultural Extension Service, other State and Federal agricultural agencies, and others with conservation interests were invited to participate in the deliberations on the State program.

The program for the State is that recommended by the State ACP Development Group and approved by the Director, Conservation and Land Use Division, ASCS.

B. Agencies to participate in development of county programs.— A County Agricultural Conservation Program shall be developed in each county in accordance with the provisions of the State program and such modifications thereof as may be made. The county program shall be developed by the County ACP Development Group consisting of the county committee (including the County Agricultural Extension Agent who is ex officio member), the designated representatives of the Soil Conservation Service in the county, and the Federal Forest Service representative having jurisdiction of farm forestry in the county. The County ACP Development Group, working with the community committeemen, the governing body of the Soil Conservation District, the farm forestry representatives of the State, the County Supervisor of the Farmers Home Administration, and others with conservation interests, shall develop recommendations for the county program.

The program for the county then shall be formulated by the County ACP Development Group in consultation with the governing body of the Soil Conservation District on the overall conservation problems in the county and, especially, on the work plans of the Soil Conservation District and of the Federal agencies involved to assure the

most effective use of the available technical assistance and funds for cost-sharing. The program as formulated shall be recommended to the State Committee for approval by the State ACP Development Group. The program for the county shall be that recommended by the County ACP Development Group and approved by the State ACP Development Group. The program recommendation shall be signed by the chairman of the county committee, the Soil Conservation Service technician, and the Forest Service representative where present in the county, and shall state that the program was developed in consultation with the governing body of the Soil Conservation District, if any, or shall state that the governing body was invited to participate in developing the program but did not accept.

C. Selection of practices.—Practices to be included in the county program shall be only those practices for which cost-sharing is essential to permit accomplishment of needed conservation work which would not otherwise be carried out.

D. Adaptation of practices.—The practices included in the county program must meet all conditions and requirements of the State program. Additional conditions and requirements may be included where necessary for effective use in meeting the conservation problems in the county.

E. Practice specifications.—Minimum specifications which practices must meet to be eligible for Federal cost-sharing are set forth in this State handbook or in the county program, or are incorporated therein by specific reference to a standard publication or other written document containing such specifications.

For those practices for which the Soil Conservation Service has technical responsibility, the responsible technician may require lines, grades, or dimensions in excess of those specified in the practices where, in the judgment of the technician, such lines, grades, or dimensions are needed to insure the safety of the practice.

F. Use of liming materials and commercial fertilizers for vegetative cover.—For practices (except practices D-1 (a) and D-1 (b)) which authorize Federal cost-sharing for applications of liming materials and commercial fertilizers, the minimum application, and maximum application where applicable, on which cost-sharing is authorized shall, in each case, be determined on the basis of a current soil test, except that in the event a soil test cannot be supplied or obtained in time to permit the orderly accomplishment of the practice, minimum and maximum lime and fertilizer requirements based on recognized local agronomic recommendations derived from soil tests of similar soils in the county may be established by the group responsible for formulating the county program.

A determination of the quantity of fertilizer, if any, needed for successful establishment of the cover under practices D-1 (a) and D-1 (b) shall be made as outlined in section 10.

The application of liming materials contained in commercial fertilizers, in rock phosphate, or in basic slag will not qualify for Federal cost-sharing. The application of manure will not qualify for Federal cost-sharing; however, manure may be used, where applicable to meet all or a part of the fertilizer requirements for a practice.

G. Specifications for liming materials and seed.—(1) *Liming materials.*—Liming materials approved for use in performing practices which authorize Federal cost-sharing for applications of liming

materials are ground limestone, marl, burnt lime, hydrated lime and alumina industry by-product lime (brown mud) containing 80 percent or more calcium carbonate equivalent and of sufficient fineness that 90 percent will pass through a U. S. Standard No. 10 sieve and that either 40 percent will pass through a U. S. Standard No. 60 sieve or 25 percent will pass through a U. S. Standard No. 100 sieve. If the material used fails to contain at least 80 percent calcium carbonate equivalent, sufficient additional material must be applied so that an equivalent of the required amount of 80 percent calcium carbonate equivalent material will have been used.

NOTE A: 1,000 pounds of burnt lime may be considered equivalent to 1 ton of ground limestone and 1,500 pounds of hydrated lime may be considered equivalent to 1 ton of ground limestone.

NOTE B: Material failing to meet the 90 percent requirement passing through a U. S. Standard No. 10 sieve may be compensated for by increased calcium carbonate equivalent so long as the product of the percent passing through a U. S. Standard No. 10 sieve and the percent calcium carbonate equivalent equals or exceeds 0.72, except that in no case may the percent passing through a U. S. Standard No. 10 sieve be less than 80.

(2) *Seed*.—Seed used to perform conservation practices contained in this State handbook shall meet the following minimum live pure seed specifications.

Name of seed:	Minimum percent live pure seed ¹
Bermudagrass	82.45
Dallisgrass	29.25
Orchardgrass	72.25
Redtop	81.00
Ryegrass	85.50
Tall fescue (Alta or Ky. 31)	82.45
Timothy	85.50
Alfalfa	87.30
Alsike clover	87.30
Bahiagrass	80.75
Ladino clover	87.30
Lespedeza (annual)	80.75
Lespedeza sericea	76.80
Red clover	87.30
Sweetclover	87.30
White clover (including giant white)	87.30
Cowpeas	81.00
Austrian Winter peas	85.50
Bur-clover (hulled)	85.50
Bur-clover (in bur)	64.00
Crimson clover (reseeding or common)	82.45
Milo	81.00
Corn	81.00
Singletary or rough peas	81.00
Vetches	80.75
Bromegrass	72.25
Millet	81.00
Oats	81.00
Rye	81.00
Sudangrass	81.00

¹Quantity of seed used failing to meet this requirement will be reduced to an equivalent quantity meeting this requirement in determining compliance with the practice provisions and for computation of cost-shares, except that no cost-sharing shall be allowed where the reduction is more than 25 percent.

Seed used to perform conservation practices contained in this State handbook must meet minimum requirements of the Arkansas State Plant Board regulations regarding noxious weed seeds, pro-

hibited seeds, and total weed seed content. Practices performed with seed containing more than 100 Johnson grass seed per pound shall not be eligible for cost-sharing.

H. Responsibility for technical phases of practices.—The Soil Conservation Service is responsible for the technical phases of practices B-6, B-7, C-4, C-5, C-7, C-9(a), C-9(b), C-9(c), C-11, C-12(a), C-12(b), C-13, C-14, G-3, and structures under G-2. This responsibility shall include (1) a finding that the practice is needed and practicable on the farm, and with respect to drainage practices, a finding as to whether any land proposed for drainage is Wetland Type 3, 4, or 5 as described in U. S. Department of the Interior, Fish and Wildlife Circular 39, "Wetlands of the United States", published in 1956, (2) necessary site selection, other preliminary work, and layout work of the practice, (3) necessary supervision of the installation, and (4) certification of performance for all requirements of the practice except those for which a certification by the farmer is to be accepted in accordance with instructions issued by the Deputy Administrator. The State Conservationist of the Soil Conservation Service may utilize assistance from private, State, or Federal agencies in carrying out these assigned responsibilities.

The Forest Service is responsible for the technical phase of practices A-7 and B-10. This responsibility shall include (1) providing necessary specialized technical assistance, (2) development of specifications for forestry practices, and (3) working through State and county committees, determining performance in meeting these specifications. In addition to the general responsibility set out above, the Forest Service is responsible for (1) practice A-7—a finding with respect to need and practicability (except for planting of pine in open areas) and for a performance certification for planting site preparation; and (2) practice B-10—a finding with respect to need and practicability; necessary site selection and advice to the farmer on the work required; and certification of performance. The Forest Service may utilize assistance from private, State, or Federal agencies in carrying out these assigned responsibilities, but services of State forestry agencies will be utilized to the full extent such services are available.

I. Rates of cost-sharing.—The rates of Federal cost-sharing in each practice are based on the percentage of the average cost of performing the practice considered necessary to obtain the needed performance of the practice. Rates of cost-sharing are not in excess of 50 percent of the average cost of performing the practices except that for practices A-7, B-10, C-4, C-5, and C-7, which have long lasting conservation benefits and from which the returns to the farmer are remote, rates of cost-sharing not in excess of 70 percent of the average cost of performing the practices have been established by the State ACP Development Group under authority specifically delegated to it by the Secretary in Section 3,H, of the National Bulletin.

Upon justification by the State and County ACP Development Groups, the Deputy Administrator may approve a rate of cost-sharing for one or more additional practices in a county in excess of 50 percent of the average cost of performing the practice, but only if the increased rate of cost-sharing is essential to introduce a greatly needed new conservation practice into the county or to bring about a

greatly needed increase in the extent to which the practice otherwise would be carried out.

Flat cost-share rates in this handbook are based on average costs for the State. For the purpose of establishing rates of cost-sharing in county programs under the provisions of the preceding paragraph or where the cost-share rate in the State handbook is stated in percentages, the average cost of performing a practice will be the average cost for the county, except that the average cost of performing a practice in well-defined parts of a county may be used in establishing rates of cost-sharing for the practice in such well-defined areas when there is a substantial difference in the cost of performing the practice in such areas.

The rates of cost-sharing for practices included in the county program may be lower than the rates approved for general use in the State and shall be lower, if necessary, to result in a cost-share rate in the county which will be such that the farmer will make a substantial contribution to the cost of performing the practice.

J. County handbooks, instructions, and forms.—The State Committee, under the general supervision of the Deputy Administrator is authorized to prepare and issue county handbooks, instructions, and forms required in implementing the administration of the 1964 program, except that a form designed to obtain information from farmers must be approved by the Deputy Administrator. Persons wishing to participate in the program should obtain from the State Committee or county committee all information needed in order to comply with all provisions of the program.

Section 4—APPROVAL OF CONSERVATION PRACTICES ON INDIVIDUAL FARMS

A. Opportunity for requesting cost-sharing.—Each farmer shall be given an opportunity to request that the Federal Government share in the cost of those practices on which he considers he needs such assistance in order to permit their performance on his farm. The county committee, taking into consideration the farmer's request and any conservation plan developed by the farmer with the assistance of any State or Federal agency, shall direct the available funds for cost-sharing to those farms and to those practices where cost-sharing is considered most essential to the accomplishment of the basic conservation objective of the Department—the use of each acre of agricultural land within its capabilities and the treatment of each acre in accordance with its needs for protection and improvement.

B. Prior request for cost-sharing.—Costs will be shared only for those practices, or components of practices, for which cost-sharing is requested by the farmer before performance thereof is started, except that for practices F-3 and F-4, costs may be shared if cost-sharing is requested within 30 days after the practice is approved for use in the county or before the date on which performance of the eligible measures is started, whichever is the later. For practices for which (1) approval was given under the 1963 Agricultural Conservation Program, (2) performance was started but not completed during the 1963 program year, and (3) the county committee believes the extension of the approval to the 1964 program is justi-

fied under the 1964 program regulations and provisions, the filing of the request for cost-sharing under the 1963 program may be regarded as meeting the requirement of the 1964 program that a request for cost-sharing be filed before performance of the practice is started.

C. Method and extent of approval.—The county committee, in accordance with a method approved by the State Committee, will determine the extent to which Federal funds will be made available to share the cost of each approved practice on each farm, taking into consideration the county allocation, the conservation problems in the county and of the individual farm, and the conservation work for which requested Federal cost-sharing is considered by the county committee as most needed in 1964. The method approved shall provide for the issuance of notices of approval showing for each approved practice the number of units of the practice for which the Federal Government will share in the cost and the amount of the Federal cost-share for the performance of that number of units of the practice. To the extent practicable, notices of approved practices shall be issued before performance of the practices is started. No practice may be approved for cost-sharing except as authorized by the national, State, or county program, or in accordance with procedures incorporated therein. Available funds for cost-sharing shall not be allocated on a farm or acreage-quota basis, but shall be directed to the accomplishment of the most enduring conservation benefits attainable.

D. Establishment or installation of practices.—Federal cost-sharing may be authorized for the first establishment or installation of a practice with cost-sharing since the 1953 program on a particular piece of land while under the control of the current operator. Federal cost-sharing may also be authorized for replacement, enlargement, or restoration of practices for which cost-sharing has been allowed under the 1954 or a subsequent program if the practice has served for its normal lifespan (normal lifespans for practices other than annual or rotation type vegetative cover practices carried out under the 1954 or a subsequent program will not be considered to have expired unless a lifespan is specified in the practice), or if all of the following conditions exist;

(1) Replacement, enlargement, or restoration of the practice is needed to meet the conservation problem.

(2) The failure of the original practice was not due to the lack of proper maintenance by the current operator.

(3) The county committee believes that the replacement, enlargement, or restoration of the practice merits consideration under the program to an equal extent with other practices for which cost-sharing has not been allowed under a previous program.

E. Repair, upkeep, and maintenance of practices.—Federal cost-sharing is not authorized for repairs or for normal upkeep or maintenance of any practice.

F. Pooling agreements.—Farmers in any local area may agree in writing, with the approval of the county committee, to perform designated amounts of practices which, by conserving or improving the agricultural resources of the community, will solve a mutual conservation problem on the farms of the participants. For purposes of eligibility for cost-sharing, practices carried out under such an

approved written agreement will be regarded as having been carried out on the farms of the persons who performed the practices.

Section 5—PRACTICE COMPLETION REQUIREMENTS

A. Completion of practices.—Federal cost-sharing for the practices contained in section 10 is conditioned upon the performance of the practices in accordance with all applicable specifications and program provisions. Except as provided in sections 5B, 5C, and 5D, practices must be completed during the program year in order to be eligible for cost-sharing.

B. Practices substantially completed during program year.—Approved practices may be deemed, for purposes of payment of cost-shares, to have been carried out during the 1964 program year, if the county committee determines that they are substantially completed by the end of the program year. However, no cost-shares for such practices shall be paid until they have been completed in accordance with all applicable specifications and program provisions, except as provided in section 5, C.

C. Practices requiring more than one program year for completion.—Cost-shares approved under the 1964 program will not be considered as earned until all components of the approved practices are completed in accordance with all applicable specifications and program provisions. Cost-shares for completed components may be paid only after the practice is substantially completed and only on the condition that the farmer will complete the remaining components of the practice within the time prescribed by the county committee which will afford the farmer a fair and reasonable opportunity to complete them, unless prevented from doing so for reasons beyond his control and regardless of whether cost-sharing therefor is offered, or refund the cost-shares paid to him.

D. Practices involving the establishment or improvement of vegetative cover.—Costs for practices involving the establishment or improvement of vegetative cover, including trees, may be shared even though a good stand is not established, if the county committee determines, in accordance with standards approved by the State Committee, that the practice was carried out in a manner which would normally result in the establishment of a good stand, and that failure to establish a good stand was due to weather or other conditions beyond the control of the farm operator. The county committee may require as a condition of cost-sharing in such cases that the area be reseeded or replanted, or that other needed protective measures be carried out. Cost-sharing in such cases may be approved also for repeat applications of measures previously carried out or for additional eligible measures. Cost-sharing for such measures shall be approved to the extent such measures are needed to assure a good stand even though less than that required by the applicable practice wording for initial approvals.

E. Failure to meet minimum requirements.—Notwithstanding other provisions of the 1964 program, costs may be shared for performance actually rendered even though the minimum requirements for a practice are not met, if the farmer establishes to the satisfaction of the county committee and the county representative of any other agency having responsibility for technical phases of the practice (1) that he made a reasonable effort to meet the min-

imum requirements, and (2) that the practice as performed adequately meets the conservation problem.

Section 6—FEDERAL COST-SHARES

A. Conservation materials and services.—(1) *Availability.*—Part or all of the Federal cost-share for an approved practice may be in the form of conservation materials or services furnished through the program for use in carrying out the practice. Materials or services may not be furnished to persons who are indebted to the Federal Government, as indicated by the debt record maintained in the office of the county committee, except in those cases where the agency to which the debt is owed waives its rights to setoff in order to permit the furnishing of materials and services.

(2) *Cost to farmer.*—The farmer will be responsible for paying that part of the cost of the material or service which is in excess of the amount to be advanced toward the purchase of the material or service. The maximum amount which may be advanced toward the purchase of the material or service is the Federal cost-share attributable to the use of the material or service, or, upon request by the farmer and approval by the county committee, it may include the applicable small cost-share increase, and on purchase orders for seed it may also include the Federal cost-share applicable to the seedbed preparation. The amount advanced shall not be in excess of the cost of the material or service.

(3) *Responsibility for materials and services.*—If the material or service is properly used in carrying out the practice with respect to which it was furnished, recovery of the amount advanced toward the purchase of the material or service will be made from the persons who share in the cost-share payment for the practice, in the proportion in which they share in the cost-share payment. If the material or service is not used for the purpose for which it was furnished, the person to whom it was furnished shall be indebted to the Federal Government for the amount advanced toward the cost of the material or service.

Any person to whom materials are furnished shall be responsible to the Federal Government for any damage to the materials, unless he shows that the damage was caused by circumstances beyond his control. If materials are abandoned or not used during the program year, they may, in accordance with instructions issued by the Deputy Administrator be transferred to another person or otherwise disposed of at the expense of the person who abandoned or failed to use the material, or be retained by the person for use in a subsequent program year.

(4) *Rates of cost-sharing for practices carried out with materials and services.*—The rates of cost-sharing to be used in computing cost-shares for practices, or components of practices, carried out with conservation materials and services shall be the rates of cost-sharing in effect at the time the conservation materials and services are furnished.

B. Practices carried out with aid from ineligible persons.—The entire Federal cost-share for a practice carried out with aid from an ineligible person, including a State or Federal agency, shall be credited to the eligible persons who contributed to the cost of carrying out the practice; provided that the cost-share credited to an

eligible person shall not exceed his contribution to the cost of carrying out the practice.

C. Division of Federal cost-shares.—(1) *Federal cost-shares.*—The Federal cost-share for a practice shall be credited to the person who carried out the practice. If more than one person contributed to the carrying out of a practice, the Federal cost-share for the practice shall be divided among such persons in the proportion that the county committee determines they contributed to the carrying out of the practice. In making this determination, the county committee shall take into consideration the value of the labor, equipment, or material contributed by each person toward the carrying out of the practice, and shall assume that each contributed equally unless it is established to the satisfaction of the county committee that their respective contributions thereto were not in equal proportion. Advances toward the cost of materials or services under section 6, A, the furnishing of land, and the furnishing of the right to use water will not be considered as a contribution to the carrying out of any practice.

(2) *Death, incompetency, or disappearance.*—In case of death, incompetency, or disappearance of any person, any Federal share of the cost due him shall be paid to his successor, determined in accordance with the provisions of the regulations in ACP—122, as amended.

D. Increase in small Federal cost-shares.—For practices other than practice F-4, the Federal cost-share computed for any person with respect to any farm shall be increased as follows:

(1) Any Federal cost-share amounting to \$0.71 or less shall be increased to \$1.

(2) Any Federal cost-share amounting to more than \$0.71, but less than \$1, shall be increased by 40 percent.

(3) Any Federal cost-share amounting to \$1 or more shall be increased in accordance with the following schedule:

Amount of cost-share computed	Increase in cost-share	Amount of cost-share computed	Increase in cost-share	Amount of cost-share computed	Increase in cost-share
\$1 to \$1.99	\$0. 40	\$22 to \$22.99	\$8. 40	\$43 to \$43.99	\$12. 30
\$2 to \$2.99	. 80	\$23 to \$23.99	8. 60	\$44 to \$44.99	12. 40
\$3 to \$3.99	1. 20	\$24 to \$24.99	8. 80	\$45 to \$45.99	12. 50
\$4 to \$4.99	1. 60	\$25 to \$25.99	9. 00	\$46 to \$46.99	12. 60
\$5 to \$5.99	2. 00	\$26 to \$26.99	9. 20	\$47 to \$47.99	12. 70
\$6 to \$6.99	2. 40	\$27 to \$27.99	9. 40	\$48 to \$48.99	12. 80
\$7 to \$7.99	2. 80	\$28 to \$28.99	9. 60	\$49 to \$49.99	12. 90
\$8 to \$8.99	3. 20	\$29 to \$29.99	9. 80	\$50 to \$50.99	13. 00
\$9 to \$9.99	3. 60	\$30 to \$30.99	10. 00	\$51 to \$51.99	13. 10
\$10 to \$10.99	4. 00	\$31 to \$31.99	10. 20	\$52 to \$52.99	13. 20
\$11 to \$11.99	4. 40	\$32 to \$32.99	10. 40	\$53 to \$53.99	13. 30
\$12 to \$12.99	4. 80	\$33 to \$33.99	10. 60	\$54 to \$54.99	13. 40
\$13 to \$13.99	5. 20	\$34 to \$34.99	10. 80	\$55 to \$55.99	13. 50
\$14 to \$14.99	5. 60	\$35 to \$35.99	11. 00	\$56 to \$56.99	13. 60
\$15 to \$15.99	6. 00	\$36 to \$36.99	11. 20	\$57 to \$57.99	13. 70
\$16 to \$16.99	6. 40	\$37 to \$37.99	11. 40	\$58 to \$58.99	13. 80
\$17 to \$17.99	6. 80	\$38 to \$38.99	11. 60	\$59 to \$59.99	13. 90
\$18 to \$18.99	7. 20	\$39 to \$39.99	11. 80	\$60 to \$185.99	14. 00
\$19 to \$19.99	7. 60	\$40 to \$40.99	12. 00	\$186 to \$199.99	(¹)
\$20 to \$20.99	8. 00	\$41 to \$41.99	12. 10	\$200 and over	(²)
\$21 to \$21.99	8. 20	\$42 to \$42.99	12. 20		

¹ Increase to \$200.

² No increase.

E. Maximum Federal cost-share limitation.—For practices other than practice F-4, the total of all Federal cost-shares under the 1964 program to any person with respect to farms, ranching units, and turpentine places in the United States, Puerto Rico, and the Virgin Islands for approved practices which are not carried out under pooling agreements shall not exceed the sum of \$2,500, and for all approved practices, including those carried out under pooling agreements, shall not exceed the sum of \$10,000.

All or any part of any Federal cost-share which otherwise would be due any person under the 1964 program may be withheld, or required to be refunded, if he has adopted, or participated in adopting, any scheme or device, including the dissolution, reorganization, revival, formation, or use of any corporation, partnership, estate, trust, or any other means, designed to evade, or which has the effect of evading, the provisions of this subsection.

F. Persons eligible to file application for payment of Federal cost-shares.—Any person who, as landlord, tenant, or sharecropper on a farm, bore a part of the cost of an approved conservation practice is eligible to file an application for payment of the Federal cost-share due him.

G. Time and manner of filing application and required information.—It shall be the responsibility of persons participating in the program to submit to the county office forms and information needed to establish the extent of the performance of approved conservation practices and compliance with applicable program provisions. Time limits with regard to the submission of such forms and information shall be established where necessary for efficient administration of the program. Such time limits shall afford a full and fair opportunity to those eligible to file the forms or information within the period described. At least 2 weeks' notice to the public shall be given of any general time limit prescribed. Such notice shall be given by mailing notice to the office of each county committee and making copies available to the press. Other means of notification, including radio announcements and individual notices to persons affected, shall be used to the extent practicable. Notice of time limits which are applicable to individual persons, such as time limits for reporting performance of approved practices, shall be issued in writing to the persons affected.

Payment of Federal cost-shares will be made only upon application submitted on the prescribed form to the county office on or before June 30, 1965. Any application for payment may be rejected if any form or information required of the applicant is not submitted to the county office within the applicable time limit. Notwithstanding any other provision of this handbook, cash payments amounting to less than \$1 will not be made.

Exceptions to time limits may be made in cases where failure to submit required forms and information within the applicable time limits is due to reasons beyond the control of the farmer, but no time limit may be extended beyond December 31, 1965.

H. Appeals.—Any person may, within 15 days after notice thereof is forwarded to or made available to him, request the county committee or State Committee in writing to reconsider its recommendation or determination in any matter affecting the right to or the amount of his Federal cost-shares with respect to the farm. If the person is dissatisfied with the decision of the county committee,

he may, within 15 days after the decision is forwarded to or made available to him, appeal in writing to the State Committee. If he is dissatisfied with the decision of the State Committee, he may, within 15 days after its decision is forwarded to or made available to him, request the Deputy Administrator to review the decision of the State Committee. The decision of the Deputy Administrator shall be final. All appeals shall be considered as soon as practicable after they are filed, and prompt written notice of the decision shall be given to the appellant. Written notice of any decision rendered under this subsection by the county or State committee shall also be issued to each other landlord, tenant, or sharecropper on the farm who may be adversely affected by the decision.

Appeals considered under this subsection shall be decided in accordance with the applicable program provisions on the basis of the facts of the individual case; provided that the Deputy Administrator may allow cost-shares for performance not meeting all program requirements, where not prohibited by statute, if in his judgment such action is needed to permit a proper disposition of the appeal. Such action may be taken only where the farmer, in reasonable reliance on any instruction or commitment of any member, employee, or representative of a State or county committee, in good faith performed an eligible conservation practice and such performance reasonably accomplished the conservation purpose of the practice. The amount of the cost-share in such cases shall be computed on the actual performance and shall not exceed the amount to which the farmer would have been entitled if the performance rendered had met all requirements for the practice.

Section 7—GENERAL PROVISIONS RELATING TO FEDERAL COST-SHARING

A. Compliance with regulatory measures.—Persons who carry out conservation practices under the 1964 program shall be responsible for obtaining the authorities, rights, easements, or other approvals necessary to the performance and maintenance of the practices in keeping with applicable laws and regulations. The person with whom the cost of the practice is shared shall be responsible to the Federal Government for any losses it may sustain because he infringes on the rights of others or fails to comply with applicable laws or regulations.

B. Maintenance and use of practices.—The sharing of costs, by the Federal Government, for the performance of approved conservation practices on any farm under the 1964 program will be subject to the condition that the person with whom the costs are shared will maintain and use such practices for the conservation purposes for which cost-sharing was authorized throughout their normal lifespans as long as the land on which they are carried out is under his control, unless the State or county committee determines that good farming practice does not require such maintenance and use or that the failure to so maintain and use the practices was due to conditions beyond his control.

C. Practices defeating purposes of programs.—If the county committee finds with the concurrence of the State committee, or if the State committee finds, that any person has adopted or partic-

ipated in any practice during the 1964 program year which tends to defeat the purposes of the 1964 or any previous program, including, but not limited to, failure to maintain, in accordance with good farming practices, practices carried out under a previous program, it may withhold, or require to be refunded, all or any part of the Federal cost-share which otherwise would be due him under the 1964 program.

D. Depriving others of Federal cost-share.—If the State Committee finds that any person has employed any scheme or device (including coercion, fraud, or misrepresentation), the effect of which would be or has been to deprive any other person of the Federal cost-share due that person under the program, it may withhold, in whole or in part, from the person participating in or employing such a scheme or device, or require him to refund in whole or in part, the Federal cost-share which otherwise would be due him under the 1964 program.

E. Filing of false claims.—If the State Committee finds that any person has knowingly supplied false information, or has knowingly filed a false claim, including a claim for payment of the Federal cost-share under the program for practices not carried out or for practices carried out in such a manner that they do not meet the required specifications therefor, such person shall not be eligible for any Federal cost-share under the 1964 program and shall refund all amounts that may have been paid to him under the 1964 program. The withholding or refunding of Federal cost-shares will be in addition to and not in substitution of any other penalty or liability which might otherwise be imposed.

F. Misuse of purchase orders.—If the State Committee finds that any person has knowingly used a purchase order issued to him for conservation materials or services for a purpose other than that for which it was issued, and that such misuse of the purchase order tends to defeat the purpose for which it was issued, such person shall not be eligible for any Federal cost-share under the 1964 program and shall refund all amounts that may have been paid to him under the 1964 program. The withholding or refunding of Federal cost-shares will be in addition to and not in substitution of any other penalty or liability which might otherwise be imposed.

G. Federal cost-shares not subject to claims.—Any Federal cost-share, or portion thereof, due any person shall be determined and allowed without regard to questions of title under State law; without deduction of claims for advances (except as provided in the following subsection, and except for indebtedness to the United States subject to setoff under orders issued by the Secretary); and without regard to any claim or lien against any crop, or proceeds thereof, in favor of the owner or any other creditor.

H. Assignments.—Any person who may be entitled to any Federal cost-share under the 1964 program may assign his right thereto, in whole or in part, as security for cash loaned or advances made for the purpose of financing the making of a crop in 1964, including the carrying out of conservation practices. No assignment will be recognized unless it is made in writing on Form ACP-69 and in accordance with instructions issued by the Deputy Administrator.

Section 8—DEFINITIONS

For the purposes of the 1964 program:

(a) "Secretary" means the Secretary of Agriculture of the United States or any officer or employee of the Department to whom authority has been delegated, or to whom authority may hereafter be delegated, to act in his stead.

(b) "Deputy Administrator" means the Deputy Administrator, State and County Operations, Agricultural Stabilization and Conservation Service.

(c) "State Committee" means the persons in the State designated by the Secretary as the Agricultural Stabilization and Conservation State Committee under section 8(b) of the Soil Conservation and Domestic Allotment Act, as amended.

(d) "County Committee" means the persons elected within a county as the county committee pursuant to regulations governing the selection and functions of Agricultural Stabilization and Conservation county and community committees under section 8(b) of the Soil Conservation and Domestic Allotment Act, as amended.

(e) "Person" means an individual, partnership, association, corporation, estate, or trust, or other business enterprise, or other legal entity (and, wherever applicable, a State, a political subdivision of a State, or any agency thereof) that, as landlord, tenant, or sharecropper, participates in the operation of a farm.

(f) "Farm" means that area of land considered as a farm under the current definition of farm applicable to marketing quota and acreage allotment programs.

(g) "Cropland" means that land considered as cropland under the current definition of cropland applicable to marketing quota and acreage allotment programs.

(h) "Program year" means the period July 1, 1963, through December 31, 1964, during which conservation practices, or components thereof, must be carried out to be eligible for cost-sharing.

Section 9—AUTHORITY, AVAILABILITY OF FUNDS, AND APPLICABILITY

A. Authority.—The program contained in this handbook is based upon, and is subject to, the provisions of the 1964 National Agricultural Conservation Program, as approved by the Secretary of Agriculture.

B. Availability of funds.—The provisions of the 1964 program are necessarily subject to such legislation as the Congress of the United States may hereafter enact; the paying of the Federal cost-shares provided herein is contingent upon such appropriation as the Congress may hereafter provide for such purpose; and the amounts of such Federal cost-shares will necessarily be within the limits finally determined by such appropriation.

The funds provided for the 1964 program will not be available for paying Federal cost-shares for which applications are filed in the county office after December 31, 1965.

C. Applicability.—The provisions of the 1964 program contained herein are not applicable to (1) any department or bureau of the U. S. Government or any corporation wholly owned by the United States; (2) noncropland owned by the United States which was

acquired or reserved for conservation purposes, or which is to be retained permanently under Government ownership, including, but not limited to, grazing lands administered by the Forest Service of the U. S. Department of Agriculture, or by the Bureau of Land Management (including lands administered under the Taylor Grazing Act) or the Fish and Wildlife Service of the U. S. Department of the Interior, except as indicated in item (7) below; and (3) non-private persons for performance on any land owned by the United States or a corporation wholly owned by it.

The program is applicable to (1) privately owned lands; (2) lands owned by a State or political subdivision or agency thereof; (3) lands owned by corporations which are partly owned by the United States, such as production credit associations; (4) lands temporarily owned by the United States or a corporation wholly owned by it, which were not acquired or reserved for conservation purposes, including lands administered by the Farmers Home Administration, the U. S. Department of Defense, or by any other Government agency designated by the Deputy Administrator; (5) any cropland farmed by private persons which is owned by the United States or a corporation wholly owned by it; (6) Indian lands, except that where grazing operations are carried out on Indian lands administered by the Department of the Interior, such lands are within the scope of the program only if covered by a written agreement approved by the Department of the Interior giving the operator an interest in the grazing and forage growing on the land and a right to occupy the land in order to carry out the grazing operations; and (7) noncropland owned by the United States for performance by private persons of conservation practices which directly conserve or benefit nearby or adjoining privately owned lands of such persons who maintain and use such federally owned noncropland under agreement with Federal agency having jurisdiction thereof.

Section 10—CONSERVATION PRACTICES AND MAXIMUM RATES OF COST-SHARING

This section contains the conservation practices of the State program and the maximum rates of cost-sharing for each.

CONSERVATION PRACTICES WITH ENDURING BENEFITS—where properly applied and maintained

A. Practices Primarily for Establishment of Permanent Protective Cover

A-2. Establishment of a permanent vegetative cover for soil protection or as a needed land-use adjustment.

LIMITATIONS.—This practice is applicable only to land which should be established in permanent vegetative cover for protection against wind or water erosion, and to cropland which, as a part of a needed land-use adjustment, is being shifted to permanent protective vegetative cover other than as a part of a regular crop rotation. This practice is applicable only to land where it is determined that complete seedbed preparation and a full seeding are necessary.

This practice is not applicable (1) to land occupied by a merchantable stand of timber or pulpwood; (2) to land which, if cleared, would be suitable for continued production of cultivated crops; (3) to land where strip or placer mining operations have been carried out; or (4) to land where sod has been removed.

FEDERAL COST-SHARE:

- a. Seedbed preparation—\$2.50 per acre.
b. Seeding or sodding:

	Plant	Per-acre seeding rate (pounds)	Federal cost-share per pound
1.	Orchardgrass.....	15-25	\$0.18
	and either		
	Red clover (Kenland or Orbit), or	8-15 .....	.26
	Ladino clover, or	1-2 .....	.42
	White clover.....	1-2 .....	.42
2.	Tall fescue (Alta or Ky. 31).....	12-20 .....	.15
	and either		
	Red clover (Kenland or Orbit), or	8-15 .....	.26
	Ladino clover, or	1-2 .....	.42
	White clover, or	1-2 .....	.42
	Alsike clover.....	5-8 .....	.18
3.	Timothy.....	12-15 .....	.08
	and either		
	Red clover (Kenland or Orbit), or	8-15 .....	.26
	Ladino clover, or	1-2 .....	.42
	White clover.....	1-2 .....	.42
4.	Redtop.....	6-8 .....	.22
	and either		
	Ladino clover, or	1-2 .....	.42
	White clover, or	1-2 .....	.42
	Annual lespedeza ¹	15-25 { Kobe .....	.08
		{ Other .....	.06
	or		
	Alsike clover.....	5-8 .....	.18
5.	Dallisgrass.....	{ 6-12 (live pure seed in rows) } .....	.60
		{ 8-15 (live pure seed broadcast) }	
	and either		
	Ladino clover, or	1-2 .....	.42
	White clover, or	1-2 .....	.42
	Alsike clover.....	5-8 .....	.18
6.	Dallisgrass.....	{ 6-12 (live pure seed in rows) } .....	.60
		{ 8-15 (live pure seed broadcast) }	
7.	Bermudagrass seed.....	{ 1-3 (in rows) } .....	.33
	(common—hulled)	{ 3-6 (broadcast) }	
8.	Bermudagrass seed.....	{ 1-3 (in rows) } .....	.33
	(common—hulled)	{ 3-6 (broadcast) }	
	and either		
	Ladino clover, or	1-2 .....	.42
	White clover, or	1-2 .....	.42
	Reseeding crimson clover.....	15-20 .....	.14
9.	Bermuda sod (common).....	To plant 1 acre	23.00
	or		
	Bermuda sod (hybrid).....	To plant 1 acre	26.00
10.	Bermuda sod (common).....	To plant 1 acre	23.00
	or		
	Bermuda sod (hybrid).....	To plant 1 acre	26.00
	and either		
	Ladino clover, or	1-2 .....	.42
	White clover, or	1-2 .....	.42
	Reseeding crimson clover.....	15-20 .....	.14
11.	Lespedeza sericea.....	25-50 .....	.08
12.	Pensacola Bahiagrass.....	15-20 .....	.13

See footnotes at end of table, p. 17.

	Plant	Per-acre seeding rate (pounds)	Federal cost-share per pound
13.	Pensacola Bahiagrass and either	15-20	.13
	Ladino clover, or	1-2	.42
	White clover	1-2	.42
14.	Southland bromegrass and either	15-25	.18
	Red clover (Kenland or Orbit), or	8-15	.26
	Ladino clover, or	1-2	.42
	White clover	1-2	.42
15.	County groups may select, subject to the approval of the State group, one mixture not authorized above by using a combination of one of the grasses and one or more of the legumes shown in the above-listed mixtures.		

¹The seeding rate and maximum cost-share are based on unhulled seed. County groups are authorized to establish separate seeding rates and cost-share rates for hulled seed. If this is done the county handbook shall specify the minimum and maximum seeding rates and the cost-share rate for hulled seed. The seeding rate should be decreased approximately 25 percent from that for unhulled seed and the cost-share rate may be increased approximately 25 percent above that established for unhulled seed.

²Per acre.

c. Lime.—The maximum Federal cost-share shall be 50 percent of the average cost of the materials, not to exceed \$3.25 per ton of lime needed. (See section 3, F, for determination of quantity required.) County handbooks shall state a specific monetary rate of cost-sharing per ton.

d. Fertilizer—\$.045 per pound of available plant food needed. (See section 3, F, for determination of quantity required.)

TECHNICAL RECOMMENDATIONS.—In establishing a permanent cover under this practice, grasses and legumes selected should be those recommended as adapted to the area and to the soils where the plants are to be established. The combination of plants used should be that which affords the best soil protection. Weeds should be controlled. Chemical seed treatment of dallisgrass and inoculation of all legume seed is recommended.

a. *Seedbed preparation.*—The seedbed should be prepared by thoroughly breaking, plowing, or disking and firmed by rolling, dragging, or cultipacking, or by being well settled by rain.

b. *Seeding.*—The seed should be sown on a firm seedbed and covered lightly. Seedings at less than the lowest rates shown in "b" under Federal cost-share will not qualify for cost-sharing. Any seedings in excess of the highest specified rate will not increase the amount of cost-sharing for the practice.

County handbooks will specify opening and closing dates for time of planting and, where necessary, the sequence of overseeding when the mixture chosen includes overseeding.

c. *Sodding.*—The Bermuda sprigs or sod pieces should be planted in prepared soil. All sloping land should be planted on the contour. Sufficient properly distributed sprigs or sod pieces shall be used for the growth to completely cover the area sodded. This will usually require from 8,000 to 10,000 sprigs per acre. If sod pieces are used at least one healthy sod piece should be planted on each 9 square feet of area (3 foot by 3 foot intervals). Weeds and other plants should be controlled to give the Bermuda an opportunity to become established. The land on which Bermuda is planted shall not be planted to corn or other crop which will compete with the Bermuda.

County handbooks will specify opening and closing dates for time of sodding and, where necessary, the sequence of overseeding when the mixture chosen includes overseeding.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner, and in accordance with the technical requirements and practice limitations.

All seed or sod used must have been seeded or planted within the applicable period(s) shown in the county handbook.

The acreage established may be used for pasture or hay. Where seed or other materials used in carrying out the practice was purchased other than under purchase order as CMS, purchase invoices must be furnished showing the quantity and quality of seed or other materials purchased. Where homegrown seed was used, evidence must be furnished showing the quality of seed used and information satisfactory to the county committee must be furnished to indicate the quantity used.

A-3. Establishment of additional acreages of vegetative cover in crop rotation to retard erosion and to improve soil structure, permeability, or water-holding capacity.

LIMITATIONS.—This practice is applicable only to land which needs such cover to retard erosion or to improve soil structure, permeability, or water-holding capacity. Federal cost-sharing will be limited to that acreage which the county committee determines represents a desirable increase over what would be the normal plantings of eligible crops on the farm in 1964 under the normal crop rotation for the farm. In making this determination, consideration should be given to the need for this practice on cropland which the farmer intends to divert from the production of crops for which allotments are established for the farm in 1964.

FEDERAL COST-SHARE:

a. Seedbed preparation—\$2.50 per acre.

b. Seeding:

	Plant	Per-acre seeding rate (pounds)	Federal cost-share per pound
1.	Alfalfa.....	20-30	\$0.27
2.	Biennial sweetclover.....	15-20 .....	.12
3.	Tall fescue (Alta or Ky. 31).....	12-20 .....	.15
	and either		
	Ladino clover, or.....	1-2 .....	.42
	White clover.....	1-2 .....	.42
4.	Redtop.....	6-8 .....	.22
	and		
	Alsike clover.....	5-8 .....	.18
5.	Timothy.....	12-15 .....	.08
	and either		
	Red clover (Kenland or Orbit), or.....	8-15 .....	.26
	Alsike clover.....	5-8 .....	.18
6.	Orchardgrass.....	15-25 .....	.18
	and either		
	Red clover (Kenland or Orbit), or.....	8-15 .....	.26
	Alsike clover.....	5-8 .....	.18
7.	Dallisgrass.....	6-12 { (live pure seed in rows) }	.60
	and either	8-15 { (live pure seed broadcast) }	
	Ladino clover, or.....	1-2 .....	.42
	White clover.....	1-2 .....	.42
8.	Lespedeza sericea.....	25-50 .....	.08
9.	Red clover (Kenland or Orbit).....	10-15 .....	.26
10.	Southland bromegrass.....	15-25 .....	.18
	and either		
	Red clover (Kenland or Orbit), or.....	8-15 .....	.26
	Ladino clover, or.....	1-2 .....	.42
	White clover.....	1-2 .....	.42

c. Lime—The maximum Federal cost-share shall be 50 percent of the average cost of the materials, not to exceed \$3.25 per ton of lime needed. (See section 3, F, for determination of quantity required.) County handbooks shall state a specific monetary rate of cost-sharing per ton.

d. Fertilizer—\$.045 per pound of available plant food needed. (See sec. 3, F, for determination of quantity required.)

TECHNICAL RECOMMENDATIONS.—In establishing a rotation cover under this practice, the grasses and/or legumes selected shall be those recommended as adapted to the area and to the soils where the plants are to be established. The combination of plants used should be that which best accomplishes the objectives of the practice. Weeds should be controlled. Chemical treatment of dallis-grass seed and inoculation of all legume seed is recommended.

a. *Seedbed preparation.*—The seedbed should be prepared by thoroughly breaking, plowing, or disking and firmed by rolling, dragging, or cultipacking, or by being well settled by rain.

b. *Seeding.*—The seed should be sown on a firm seedbed and covered lightly. Seedings at less than the lowest rate shown in "b" under Federal cost-share will not qualify for cost-sharing. Any seedings in excess of the highest specified rates will not increase the amount of cost-sharing for the practice.

County handbooks will specify opening and closing dates for time of planting and, where necessary, the sequence of overseeding when the mixture chosen includes overseeding.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner, and in accordance with the technical requirements and practice limitations.

All seed used must have been seeded within the applicable period(s) shown in the county handbook.

The acreage established may be used for pasture or hay. Where seed or other materials used in carrying out the practice was purchased other than under purchase orders as CMS, purchase invoices must be furnished showing the quantity and quality of seed or other materials purchased. Where homegrown seed was used, evidence must be furnished showing the quality of seed used and information satisfactory to the county committee must be furnished to indicate the quantity used.

A-4. Treatment of farmland by liming to permit the use of legumes and grasses for soil improvement and protection.

LIMITATIONS.—Federal cost-sharing will be limited to the application of liming materials. This practice is applicable only to farmland devoted in 1964 to legumes (other than vegetable or truck crops, soybeans, mungbeans, and peanuts) or perennial grasses, and to farmland which the county committee determines will be devoted to such eligible uses in 1965. Cost-shares paid or advanced for materials applied under this practice will not be considered as earned unless the land is devoted to eligible grasses and legumes at the time the materials are applied or is seeded to eligible grasses and legumes in 1964 or 1965, unless the farmer is prevented from seeding the eligible grasses and legumes within such period because of conditions beyond his control. Eligible materials must be applied at a time which is in accordance with agronomic recommendations for the area and which will permit the eligible crops to receive the benefit of the materials. Costs will not be shared under this practice for application of liming materials on any land for which costs have been or will be shared under the current program for the application of liming materials under any other practice.

Cost-sharing may not be authorized for this practice on land on which this practice or another practice involving the application of liming materials was carried out or completed in 1960 or a subse-

quent year, unless a current soil test shows a need for at least 3,000 pounds of ground limestone or its equivalent per acre.

MAXIMUM FEDERAL COST-SHARE: 50 percent of the average cost of the required application of approved liming materials, not to exceed \$3.25 per ton. (See sec. 3, F, for determination of quantity required.) County handbooks shall state a specific monetary rate per ton.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the practice specifications, using approved liming materials.

Purchase invoices or sales receipts must be furnished showing the type and amount of liming materials purchased, the calcium carbonate equivalent, and fineness, unless the material was obtained under purchase order as a conservation material.

A-7. Establishment of a stand of trees on farmland for purposes other than the prevention of wind and water erosion.

(See section 3, H, for assignment of technical responsibility.)

LIMITATIONS.—No Federal cost-sharing will be allowed for planting orchard trees, shrubs, or for any plantings for ornamental purposes.

Eligible plantings are limited to shortleaf pine, loblolly pine, cypress, cottonwood, black cherry, black walnut, white ash, red cedar, red oak, white oak, and catalpa. (Underplanting is limited to pine seedlings.)

The planting site preparation part of this practice is applicable only to areas where all of the following conditions exist: (1) Where there is not an existing stand of desirable species of trees or seedlings; (2) where there are fewer than 6 well-spaced desirable seed trees per acre from which natural reseeding can be expected; and (3) where there is a competing cover of undesirable hardwoods, brush, and/or vines which will require removal before a stand of desirable species can be successfully established. This practice shall not be used to convert an area from one species of merchantable timber to establish a stand of another species or otherwise remove merchantable timber.

FEDERAL COST-SHARE:

- a. Hand planting—\$1.00 per 100 seedlings.
- b. Machine planting—\$0.80 per 100 seedlings.
- c. Planting site preparation—\$7.50 per acre.

(NOTE: If planting is performed under a cover of undesirable hardwoods and/or brush as authorized under technical recommendations and requirements, the planting is not eligible for cost-sharing unless the overstory competition is removed by not later than the end of the program year following that in which the planting is performed. Payment of any applicable cost-shares will be delayed until the overstory competition is removed.)

Costs will not be shared for performance of part "c" of this practice unless the area treated is satisfactorily planted to an eligible species by not later than the end of the program year following that in which the site preparation is performed. Payment of any cost-shares for performance of the site preparation component will be delayed until the planting has been accomplished.)

TECHNICAL REQUIREMENTS AND RECOMMENDATIONS.—Plantings may include open area plantings, interplanting in existing stands, and underplanting of pine seedlings in accordance with the following requirements:

a. *Plantings in open areas.*—Sites may be open fields or areas which have previously been cleared for planting. Either machine or hand planting may be used.

b. *Interplanting*.—Plantings may be made in plantations or natural stands of either pine or hardwood where needed to obtain desirable stocking. Areas supporting 350 or more well-spaced pine or hardwood seedlings per acre are considered to have desirable stocking and no planting will be approved for cost-sharing on such areas.

Notwithstanding the preceding sentence, if the size and spacing of the existing stand on the area is such that the stocking is considered adequate, interplanting will not be approved for cost-sharing. Hand planting will generally be required for interplanting.

c. *Underplanting*.—Pine seedlings may be planted under a cover of undesirable hardwoods or brush where this is the most practical approach to the establishment of the stand. The overstory competition must be removed within the time indicated in the parenthetical note in the Federal cost-share statement. The method outlined in practice B-10 of this handbook for release of potentially merchantable seedlings is to be used in removal of the overstory. Hand planting will generally be required for underplanting.

d. *Planting site preparation*.—The cover of undesirable hardwoods, brush, and vines is to be removed to prepare the area for planting of seedlings of an eligible species. The competing cover may be removed by chemicals as provided herein and/or mechanical means such as bulldozer, drum chopper, and disk harrow. On slopes in excess of approximately 8 percent, the type of treatment shall be such that the soil will not be disturbed. The method of mechanical treatment to be employed must meet the approval of the technician who renders technical service for the practice.

Where chemical treatment is involved, the method(s) set out below is to be followed. The treatment may include removal by treating trees approximately 2 inches or more in diameter (measured at 4½ feet from ground line) by frill girdling or equivalent (i.e., use of mechanical girdler) followed by treating with a 3-percent solution of 4-pound acid per gallon 2,4,5-T in diesel oil (e.g., 1 gallon of 4-pound acid 2,4,5-T to 33⅓ gallons of diesel oil), or equivalent chemical (i.e., ammate crystals), or by treatment only at base of tree using injector at one inch intervals not more than 4 inches above ground line, using a 10-percent solution of 2,4,5-T in diesel oil (i.e., 1 gallon of 4-pound acid 2,4,5-T to 10 gallons of diesel oil). Trees less than approximately 2 inches in diameter may be basal sprayed on the lower 18 inches of the trunk with a 3-percent solution of 2,4,5-T in diesel oil or may be cut at a height not to exceed 6 inches above ground level and stump treated with a 10-percent solution of 2,4,5-T, or with ammate crystals.

It is recommended that an oil soluble dye (either dark blue, red, purple, or dark grey in color) be used in all chemical mixtures.

The satisfactory planting of eligible species must be completed within the time indicated in the parenthetical note in the Federal cost-share statement.

e. *Time of planting*.—Planting must be done between November 1 and March 31.

f. *Spacings*.—The following spacings shall be observed in the planting of the trees in open fields or openings in woodlands. (The notice of approval shall indicate the spacing approved for the individual practice.)

Pine:

Approximately 6 feet by 8 feet (907 trees per acre);¹ or
Approximately 6 feet by 10 feet (726 trees per acre);¹ or
Approximately 6 feet by 12 feet (605 trees per acre);¹ or
Approximately 7 feet by 8 feet (778 trees per acre);¹ or
Approximately 7 feet by 10 feet (622 trees per acre);¹ or
Approximately 8 feet by 8 feet (681 trees per acre).¹

Hardwoods (other than cottonwood);

Approximately 10 feet by 10 feet (436 trees per acre).

Cottonwood:

Approximately 7 feet by 10 feet (622 cuttings per acre); or

Approximately 9 feet by 9 feet (537 cuttings per acre).

(NOTE: Cottonwood plantings.—The technician will advise the farmer of the type and size of cottonwood cuttings required, special planting practices which should be observed, and any other operations which are considered necessary for installation of the practice in a workmanlike manner. Special instructions to be observed in performance of the practice will be included in a written plan for the practice. An on-site check of performance by a technician, or a representative of the county committee who is familiar with practice requirements, is required.)

¹ Indicated number of trees per acre is applicable to solid plantings. Where interplanting is involved, the number of seedlings will vary with size of openings to be planted.

g. *Other requirements.*—No planting will be done (1) during freezing weather, (2) in frozen soil, or (3) when the soil moisture is very high (saturated) or very low (dry).

Seedlings are to be planted slightly deeper (up to 1 inch) than grown in the nursery. Roots must be protected from drying out at all times until planted. Ample depth and space is to be provided in the opening to permit planting without crowding, or U-folding or L-folding the roots.

Hardwood plantings should be kept free of competing brush and vine growth for 2 years after planting.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with practice limitations and technical requirements. Plantings must be protected from fire and livestock damage.

Purchase invoices or other evidence of receipt for seedlings must be furnished.

B. Practices Primarily for Improvement and Protection of Established Vegetative Cover

B-1. Improvement of an established permanent vegetative cover for soil or watershed protection.

LIMITATIONS.—This practice is applicable only to land in permanent vegetative cover which needs more than normal maintenance measures in order to provide adequate soil or watershed protection. This practice is not applicable to land on which the needed improvement measures will constitute complete reestablishment of the vegetative cover. The improvement measures approved for cost-sharing shall be only those which will extend materially the life of the vegetative cover.

Except as provided in section 4, D, cost-sharing may not be authorized for this practice on land on which this practice, or a practice involving the establishment of the eligible vegetative cover, was carried out or completed in 1961 or a subsequent year.

The practice is applicable only to land on which there is a stand of one of the perennial grasses included in practice A-2. The stand must be sufficient that adequate soil or watershed protection can reasonably be expected as a result of application of the needed

improvement measures. Costs may not be shared for annual top-dressings with fertilizers or other normal maintenance measures; however, costs may be shared for the fertilizer component of this practice (along with other required components) when the fertilizer is necessary to bring about the desired improvement of the vegetative cover necessary to extend materially its life.

FEDERAL COST-SHARE:

a. Seedings:

Plant	Seeding rate per-acre (pounds)	Federal cost-share per pound
1. Annual lespedeza ¹	15-25 { Kobe	\$0.08
	{ Other .....	.06
2. Reseeding crimson clover.....	15-20 .....	.14
3. Ladino clover, or.....	1-2 .....	.42
White clover.....	1-2 .....	.42

¹The seeding rate and maximum cost-share rate are based on unhulled seed. County groups are authorized to establish separate seeding rates and cost-share rates for hulled seed. If this is done, the county handbook shall specify the minimum and maximum seeding rates and the cost-share rate for hulled seed. The seeding rate should be decreased approximately 25 percent from that for unhulled seed and the cost-share rate may be increased approximately 25 percent above that established for unhulled seed.

b. Lime—The maximum Federal cost-share shall be 50 percent of the average cost of the materials, not to exceed \$3.25 per ton of lime needed. (See section 3, F, for determination of quantity required.) County handbooks shall state a specific monetary rate of cost-sharing per ton.

c. Fertilizer—\$0.045 per pound of available plant food needed. (See section 3, F, for determination of quantity required.)

d. Removal of brush, vines, stumps, and/or rocks—\$6 per acre. (NOTE: Inclusion of this component in county handbooks for cost-sharing is optional with county groups; however, costs may not be shared for other components on land where this component is needed unless the brush, vines, stumps, and/or rocks are removed to the extent that satisfactory improvement of the vegetative cover can be obtained by performance of the authorized components.)

TECHNICAL RECOMMENDATIONS—a. *Seedings*.—In seeding to improve a cover under this practice, the legume selected shall be that which is recommended as adapted to the area and to the soils where the plants are to be established and which, together with the base grass already on the area, should afford the best soil or watershed protection. Weeds should be controlled. Inoculation of all legume seed is recommended.

The area improved should be disked lightly or harrowed to get the seed in contact with the ground. Seedings at less than the lowest indicated rates will not qualify for cost-sharing. Any seedings in excess of the highest indicated rates will not increase the amount of cost-sharing. County handbooks will specify opening and closing dates for time of planting.

b. *Removal of brush, vines, stumps, and/or rocks*.—(Applicable only when cost-share rate "d" is included in the county program.)

An on-the-site inspection by a representative of the county committee is required before approval of this component of the practice. The component shall not be approved unless it is found that all of the following conditions exists: (1) At least 2 man-days' work (using tools ordinarily found on the average farm), or equivalent, per acre is estimated to be required in removal of the brush, vines, stumps, and/or rocks; (2) performance of this component is necessary to successful improvement of the established vegetative cover; (3) performance of this component, together with any other needed component(s) of the practice, can reasonably be expected to result in an adequate permanent vegetative cover on the area; and (4) the topography is such that the area can be mowed.

The group responsible for development of the county program shall specify in the county handbook the method(s) of performance of this component. The method(s) so specified for removal of brush and vines shall be such as is in accordance with good farming practices and which can reasonably be expected to result in adequate elimination of the brush and vines which are retarding the growth of the cover of permanent grasses and/or legumes.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations stated above.

All seed used must have been seeded within the applicable seeding period(s) shown in the county handbook. Where seed or other material used in carrying out the practice was purchased other than under purchase order as CMS, purchase invoices must be furnished showing the quantity and quality of seed or other materials purchased. Where homegrown seed was used, evidence must be furnished showing the quality of seed used and information satisfactory to the county committee must be furnished to indicate the quantity used.

B-3. Controlling competitive shrubs to permit growth of adequate desirable vegetative cover for soil protection on range or pasture land.

LIMITATIONS AND PRELIMINARY REQUIREMENTS.—The practice is applicable only to land devoted to pasture or range uses which (1) was in a cleared state (includes open prairie or savannah areas) within the last 10 years; (2) on which there is an encroachment of competing shrubs which is preventing the growth of desirable pasture or range plants; (3) which will require more than normal pasture or range management measures to remove the undesirable competing shrubs; and (4) on which the removal of the competing shrubs can be expected to result in marked improvement in the growth of the desirable pasture or range plants.

The practice will not be approved on areas where the control of the competitive shrubs will reduce the cover to such an extent as to induce erosion unless followed by seeding. Costs will not be shared for treating merchantable or potentially merchantable stands of timber. Costs will not be shared for control by mechanical means on steep slopes where the application of such control measures can be expected to create a serious erosion problem or on any area where the control measures would destroy the existing cover on a substantial part of the area. A representative of the county committee shall inspect the site before approval is granted for performance of the practice.

FEDERAL COST-SHARE:

- a. Aerial application of chemicals—\$4.00 per acre.
- b. Ground application of chemicals and/or control by mechanical means—\$4.00 per acre.

Cost-shares under "a" and/or "b" above shall not exceed a total of \$320 per farm.

TECHNICAL RECOMMENDATIONS.—The competitive shrubs may be controlled chemically or mechanically. If foliage application of chemicals is used, application must be made when there is sufficient ground moisture for normal growth and must be applied when the competing shrubs are in full foliage and in no case later than June

25. Grazing on the area is to be deferred or controlled as necessary to permit adequate recovery of the cover of pasture or range plants.

a. *Chemical control.*—(1) Aerial application.—The undesirable competing shrubs must be foliage sprayed with a minimum of 2 pounds of 2,4,5-T acid equivalent of low volatile ester, mixed with 4.5 gallons of diesel oil per acre. Chemical and diesel oil must be properly mixed.

(2) Ground application (foliage).—The competing shrubs must be foliage sprayed with a minimum of 2 pounds of 2,4,5-T acid equivalent of low volatile ester mixed with 5 gallons of diesel oil with 95 gallons of water added. Mixture must be stirred often enough to maintain the mixture in solution. The foliage must be made thoroughly wet with the mixture.

(3) Tree injector.—If there are any shrubs on the area to which the practice is applied which can best be treated by the tree injector method, this method may be used in treating such shrubs. One gallon, or 4 pounds of 2,4,5-T acid equivalent of low volatile ester to 10 gallons of diesel oil is the formula to be used. Injections are to be made as close to the ground as possible. Injections should be spaced 3 inches apart around the trunk and exposed roots above ground level.

An application of spray in the year following the initial application may be needed to adequately control competing shrubs. Where a second spraying is needed, it must be applied to complete the practice and costs may be shared for the second application if such cost-sharing is approved by the county committee in the following year. When a second application is required, the same formula and time and rate of application as applicable to the initial application is to be observed.

b. *Mechanical control.*—Competing shrubs must be completely removed by cutting and burning, or by other means which will leave the area in such condition that it can be mowed with an ordinary farm mowing machine to prevent reinfestation of the competing shrubs.

PERFORMANCE.—The practice must be carried out in a workman-like manner and in accordance with the technical requirements and practice limitations stated above. Esters used must comply with the requirements of the Arkansas State Plant Board. Plane operators and power spraying equipment must be licensed by, and the application of chemicals must be in accordance with provisions of the Arkansas State Plant Board regarding chemical spraying. Where chemical spraying is done by a contractor, an invoice from the contractor showing acreage sprayed, formula used, rate of application, and date applied, is to be obtained by the farmer and presented to the ASCS county office.

B-6. Developing springs or seeps for livestock water as a means of protecting vegetative cover or to make practicable the utilization of the land for vegetative cover.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Springs or seeps must be developed following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

The springs or seeps must be at locations which will bring about the desired protection of the vegetative cover through proper distribution of grazing or better grassland management or make practicable the utilization of the land for vegetative cover. This practice may not be approved where it is evident that the major purpose of the development is for other than livestock water.

FEDERAL COST-SHARE: 75 cents per cubic foot of storage capacity, not to exceed \$75 per development.

TECHNICAL RECOMMENDATIONS.—The development must be constructed in accordance with plans prepared by the planning technician and must include (a) a concrete or masonry spring box and cover for same; (b) a storage tank constructed of concrete, masonry, or galvanized commercial type steel of 20-gage material, or heavier; (c) a pipe having a minimum diameter of 1 inch to connect the spring box and storage tank; and (d) a water source that can be expected to afford a year-round supply of stock water.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

Measurements of the various dimensions of the completed structure must be reported showing the number of cubic feet in spring box and storage tank.

B-7. Constructing or enlarging ponds as a means of protecting vegetative cover or to make practicable the utilization of the land for vegetative cover.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Dams must be constructed following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

The dams must be at locations which will bring about the desired protection of the vegetative cover through proper distribution of grazing or better grassland management or make practicable the utilization of the land for vegetative cover. The practice may not be approved where it is evident that the major purpose will be for such use as recreation, irrigation, wildlife, etc. Each structure must be justified on a bona fide need for water to provide a means of protecting vegetative cover or utilizing land for vegetative cover.

Federal cost-sharing will not be allowed under this practice for moving or placing material in excess of that required to meet the lines, grades, and dimensions specified in the plans.

FEDERAL COST-SHARE:

- a. 8 cents per cubic yard of earth moved, not to exceed \$160 per pond.
- b. \$25 for pipe for supplying water to watering trough. (Federal cost-sharing under this provision is limited to installations cited in paragraph 1(1) of the technical recommendations.)
- c. Drop inlets, if needed—(Federal cost-sharing under this provision is limited to installations cited in paragraph 1(2) of the technical recommendations):

Pipe (diameter in inches)	Per linear foot
(1) 6	\$0.50
(2) 8	.75
(3) 10	.90
(4) 12	1.00
(5) 14	1.15
(6) 15	1.20
(7) 16	1.25
(8) 18	1.40
(9) 20	1.55
(10) 21	1.60
(11) 24	1.85
(12) 30	2.25
(13) 36 or over	2.70
d. Antiseep collars	\$0.63 sq. ft.

TECHNICAL RECOMMENDATIONS.—The following specifications are for dams with fill height not exceeding 20 feet or storage capacity not exceeding 50 acre-feet. (For dams with fill height or storage capacity exceeding the above, special plans and specifications must be developed.)

a. *Drainage area.*—(1) Relation between size of drainage area and the amount of water stored.—Ponds should be so located as to have drainage areas that are in balance with the amount of water to be stored. If the drainage area is too small, the pond will not furnish a dependable supply of water, and if too large, there will be excessive outflow, making it difficult to control erosion in the spillway. Excessive rates of sediment depositions often occur if the drainage area is too large.

(2) Sediment hazards.—Ponds must not be located on eroding drainage areas where it is evident that the pond would be filled with sediment in a relatively short time. A sod or other permanent vegetative strip must be present or provided where the danger of excessive sediment is a problem.

b. *Depth.*—The pond should have a minimum depth of 6 feet which should extend over at least one-fourth of the pond area. The shallow area of the pond should be at least 18 inches in depth to the fullest extent practicable.

c. *Spillways.*—A spillway sufficient to carry the maximum outflow expected on a frequency of once in 50 years must be provided for each pond. A vegetated spillway must be wide enough to carry this expected flow at a depth not exceeding 2 feet and velocity not exceeding 8 feet per second. All spillways must be protected against erosion by the use of vegetation or structures, unless they are located on a natural formation such as limestone, sandstone, or conglomerate that will not erode at the designed velocity.

Where drainage areas exceed 50 acres and spillways are located on erosive soils or exceed 75 acres and spillways are located on erosion-resistant soils, vegetated spillways must be protected by the installation of a pipe conduit that will provide temporary flood storage, between the conduit inlet and the spillway elevation, adequate to retain a minimum runoff of $\frac{1}{2}$ inch from the entire drainage area. Any exception to these requirements must be approved by an engineering specialist of the Soil Conservation Service.

Earth moved in excavating spillways shall not be considered as earth moved in constructing the dam unless the earth was used in the dam or in the wing of the spillway.

d. *Side slopes*.—The side slopes of the dam should not be steeper than 3 to 1 on the upstream side and 2 to 1 on the downstream side, calculated on a settled basis. On an unsettled basis, a pond will be acceptable with respect to side slopes when all of the following conditions are met: (1) The upstream slope is not steeper than (a) 2.5 to 1, where the allowance for settlement is less than 20 percent, (b) 2.1 to 1, where the allowance for settlement is 20 percent or more; (2) the outside slope is not steeper than (a) 1.5 to 1, where the allowance for settlement is 20 percent or less, (b) 1.3 to 1, where the allowance for settlement is greater than 20 percent; and (3) the planned cross section with allowance for settlement can be superimposed upon and within the plotted cross section of the completed dam.

The slope on at least one side of an excavated reservoir or "damless tank" must not be steeper than 4 to 1 and the remaining sides must not be steeper than 1.5 to 1. The excavated material shall be shaped in one of the following ways:

(a) Spread to a height not exceeding 3 feet, with the top graded to a continuous slope away from the pond, or

(b) Placed behind a berm of not less than 12 feet in width and reasonably well shaped.

e. *Freeboard*.—Freeboard, the vertical distance between the surface of the water in the spillway and the lowest point along the top of the settled dam when the spillway is flowing at the depth for which it was designed, must be at least 2 feet, except where the surface area of the pond is 1 acre or less and the drainage area not more than 20 acres. For these latter cases, the freeboard may be reduced to 1 foot, provided the vertical distance between the floor of the spillway and the top of the dam at the lowest point is not less than 2 feet in any case.

f. *Slope protection*.—(1) General.—The entire downstream slope of the fill and the upstream slope above the waterline should be seeded or sodded to perennial vegetation.

(2) Protection from wave damage.—Where the surface area of the pond exceeds 5 acres, the inside slope should be protected from wave damage by a false berm (a minimum of 8 feet in width) located near the waterline, or be protected by riprap, or the width of the dam at the planned waterline must be increased a minimum of 4 feet. This increase in width may be obtained by increasing the crown width and/or freeboard height, or by a reduction in the steepness of side slopes. Any exception to these requirements must be approved by an engineering specialist of the Soil Conservation Service.

g. *Top width*.—The minimum top width must not be less than indicated below:

Height of dam above normal ground level:	Top width
6 feet or less	6 feet
Over 6 feet but not over 11 feet	8 feet
Over 11 feet but not over 18 feet	10 feet
Over 18 feet but not over 20 feet	12 feet

h. *Foundation preparation*.—The entire base of the dam must be cleaned of all trees, stumps, limbs, and roots so that an adequate bond will be obtained between the fill and the base. This material must be pushed outside the limits of the base of the dam. The upper layer of topsoil should be stockpiled and spread over the completed

dam and spillway to help in getting vegetation established. Where the site is overlaid by permeable soil material, a core trench must be excavated at least 4 feet wide and deep enough to penetrate impervious material. Steep banks of gullies, streams, etc., must be sloped so that they are not steeper than 2 to 1 for the base width of the fill.

Earth moved in constructing the core trench shall be considered as earth moved in construction of the dam.

i. *Construction requirements.*—The fill material must be obtained from selected borrow areas meeting the approval of the designated technician. The material should be placed in the fill in uniform layers not more than approximately 12 inches thick and the equipment so routed as to give the best compaction practicable. Where bulldozer equipment is used, the material in the downstream portion of the fill should be compacted by running the equipment lengthwise of the dam at intervals. This should be done at least once for each 24 to 30 inch lift. Other methods which will give equivalent compaction will be satisfactory. Where there is variation in the material, the more impermeable material should be used in the core and in the upstream portion of the fill and less desirable material in the downstream portion.

j. *Settlement.*—Allowance for settlement will be at least 10 percent. This will be increased to at least 15 percent for dams constructed with bulldozers and to at least 20 percent for dams constructed with draglines.

k. *Storage capacity.*—The storage capacity for dugout ponds or damless tanks must be not less than 0.28 acre-foot of water. For impoundment type ponds, the storage capacity must be not less than 0.5 acre-foot of water, except that the storage capacity for ponds located in native grass pastures (range sites) may be as small as 0.28 acre-foot.

l. *Appurtenances.*—(1) It is recommended that a galvanized pipe not less than 1 $\frac{1}{4}$ inches inside diameter be installed through the lowest portion of the fill for supplying water to watering troughs. Pipe used must be placed through the fill in accordance with plans and specifications which specify the size of pipe, number and location of antiseep collars, and the elevation at which the pipe shall be located. The fill material should be thoroughly compacted around the pipe to prevent seepage. Metal pipe must be coated or painted with asphalt or other preservative material prior to installation. Other pipe of materials such as reinforced concrete or asbestos cement may be used provided watertight joints are used and provided the pipeline is cradled in concrete. If it is desirable to install a pipe for the purpose of draining the pond, the pipe size should be adequate to drain the pond in approximately 7 days based on "head" of water to be drained.

(2) In instances where spring flow or continuous flow after heavy rainfall is encountered, a trickle spillway in the form of metal or tile pipe should be installed at least 6 inches below spillway elevation to protect the spillway from erosion. Trickle spillways or draw-down tubes should be installed in accordance with plans and specifications which specify pipe size and location, number and location of antiseep collars, and method of placement through the fill. Federal cost-sharing may be approved for drop inlets, and

required antiseep collars, where needed. To be eligible for Federal cost-sharing, the drop inlet and antiseep collars must meet the specifications, technical requirements, and performance requirements of practice C-7.

Fencing of dams and reservoirs is often advantageous to protect the embankment from excessive trampling, to protect vegetated spillways, to develop and protect food and cover around pond edges for wildlife, and to prevent damage to fish production. Due consideration should be given this in planning the water supply and fencing is recommended where it is needed.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee when the earthwork of the structure has been completed in order that a performance check may be made.

B-10. Improvement of a stand of forest trees on farmland.

(See section 3,H, for assignment of technical responsibility.)

LIMITATIONS AND PRELIMINARY REQUIREMENTS.—The part of this practice relating to release of desirable trees or seedlings is applicable only to areas on which there are unmerchantable trees, diseased or insect-infested trees, and/or trees less desirable by species or form which should be killed to release merchantable or potentially merchantable trees from competition. To be eligible for Federal cost-sharing, there must be a minimum of 350 well-distributed potential timber trees or seedlings per acre, and at least 50 percent of these trees or seedlings must be in need of release from competition. Any trees removed or to be removed in the harvesting of merchantable forest products will not be considered as trees to be removed under the practice in determining whether the above-stated criteria is met with respect to the need for release.

The part of this practice applicable to site preparation for natural reseeding is applicable only to areas which have less than 350 well-distributed desirable seedlings per acre and which have six or more well-spaced desirable seed-producing trees per acre which are at least 10 inches in diameter.

FEDERAL COST SHARE:

- a. Release of desirable species—\$5.00 per acre.
- b. Site preparation for natural reseeding—\$7.50 per acre.

TECHNICAL RECOMMENDATIONS AND REQUIREMENTS.—a. *Release.*—This work shall consist of releasing merchantable or potentially merchantable trees from competition of unmerchantable trees, diseased or insect-infested trees, and trees less desirable by species or form. The release shall be accomplished by treating trees approximately 2 inches or more in diameter (measured at 4½ feet from ground line) by frill girdling or equivalent (i.e., use of mechanical girdler) followed by treating with a 3-percent solution of 4-pound acid per gallon 2,4,5-T in diesel oil (e.g., 1 gallon of 4-pound acid 2,4,5-T to 33⅓ gallons of diesel oil), or equivalent chemical (i.e., ammate crystals), or by treatment only at base of tree, using injector at one inch intervals not more than 4 inches above ground line, using a 10-percent solution of 2,4,5-T in diesel oil (e.g., 1 gallon of 4-pound acid 2,4,5-T to 10 gallons of diesel oil). Trees less than approximately 2 inches in diameter may be basal

sprayed on the lower 18 inches of the trunk, with a 3-percent solution of 2,4,5-T in diesel oil or may be cut at a height not to exceed 6 inches above ground level and stump treated with a 10-percent solution of 2,4,5-T, or with ammate crystals.

It is recommended that an oil soluble dye (either dark blue, red, purple, or dark grey in color) be used in all chemical mixtures.

b. *Site preparation for natural reseedling.*—Undesirable competing trees, vines, and brush must be removed so that seed of the desirable species can come in contact with the soil, germinate, and grow. Removal of the competing plants shall be accomplished by the type of treatment prescribed in part “a” of technical recommendations of this practice. All seed trees will be left until the area is restocked.

PERFORMANCE.—The practice must be carried out in a workman-like manner, and in accordance with practice limitations and technical requirements. The area on which the practice is performed must be protected from fire and livestock damage.

The operator, or other person sharing in the practice, must notify the county committee when the improvement work is completed.

C. Practices Primarily for the Conservation and Disposal of Water

C-4. Constructing terraces to detain or control the flow of water and check soil erosion.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Terraces must be constructed following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

FEDERAL COST-SHARE: \$2.80 per 100 linear feet.

TECHNICAL RECOMMENDATIONS.—On areas terraced under the program which are later cropped during the program year, contour farming methods must be practiced.

a. *Slopes.*—Terraces will not be approved for Federal cost-sharing when constructed (1) on permeable and slowly permeable soils with a slope in excess of 8 percent; (2) on very slowly permeable soils with a slope in excess of 5 percent; (3) on freely permeable (coarse textured) soils; or (4) on land not suited for cultivation because of excessive sheet or gully erosion or the shallow nature of the soil.

Construction of terraces may be authorized where it is necessary to cross small areas of the above conditions in order to complete the terrace system. Construction must begin at the top of the slope and proceed down the slope completing each terrace before beginning another.

b. *Alignment.*—Terraces in a system shall be made parallel where practicable. Land smoothing, a moderate amount of cutting and filling along the terrace line, use of multiple outlets, variations in grades, and other methods shall be used as needed to improve terrace alignment.

c. *Terrace lengths.*—Considered only from the standpoint of safety in carrying water, a graded terrace should be no longer than is necessary to reach a protected outlet. Terrace systems should be planned so that drainage is away from all ridges and toward all depressions. All significant depressions in the field that are a part of the natural drainage pattern should be used for terrace

outlets. It may be necessary to shape outlets where natural depressions do not exist in order to prevent terrace lengths from becoming excessive. Parallel terrace lengths draining in one direction should be 600 feet or less where the average grade exceeds 0.3 foot per 100 feet.

d. *Terrace spacing.*—The maximum vertical interval and horizontal spacing is given in the table below.

The vertical intervals (and associated horizontal distances) given in the table may be increased as much as 10 percent or 0.5 foot to provide better alignment or location, to miss obstacles in the field, to adjust for farm machinery, or to reach a satisfactory outlet.

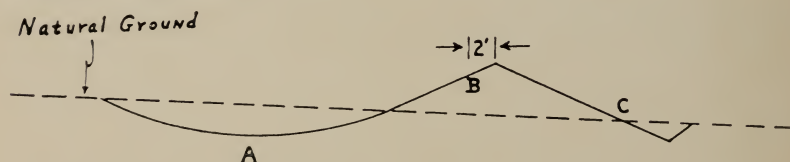
The drainage area above the top terrace shall not exceed the area that would be drained by a terrace of equal length with normal spacing.

The average of the minimum and maximum slopes above each terrace shall normally be used to determine the average percent slope.

Maximum gradient terrace spacing ¹				
Average slope Percent	Erosion-resistant soils		Erosive soils	
	Vertical interval Feet	Horizontal distance Feet	Vertical interval Feet	Horizontal distance Feet
1 or less	2.0	200	1.5	150
2	2.5	125	2.0	100
3	2.9	97	2.4	80
4	3.3	83	2.8	70
5	3.7	74	3.2	64
6	4.1	68	3.6	60
7	4.5	64	4.0	57
8	5.0	62	4.5	56

¹Spacing for parallel terraces should be adjusted to provide a convenient number of rows based upon the type of farm equipment to be used.

e. *Terrace dimensions.*—Terraces shall meet the minimum dimensions given in the following table. The width of the terrace ridge should be increased appropriately where needed for mechanized farm equipment.



A = End of front slope of terrace. Also bottom of water channel.

B = Top of ridge (measurement for height and channel capacity to be made 2 feet from center of ridge).

C = End of back slope at natural ground line.

Terrace Dimensions in Feet for Terraces 600 Feet or Less in Length

Average slope (Percent)	Height above bottom of water channel— Vertical distance "B" above "A" on sketch		Channel cross section Square Feet ¹ Measured below elevation of "B"		Width of terrace ridge—measured from "A" to "C" on sketch	
	Parallel	Conventional	Parallel	Conventional	Parallel	Conventional
2.0 or less	0.8	1.0	10	11	14	16
2.1-4.0	0.8	1.0	9	10	14	16
4.1-6.0	0.9	1.1	8	8	14	16
6.1-8.0	1.0	1.2	7	7	14	16

¹Where terraces drain over 600 feet in one direction, the cross section must be increased 10 percent for terraces draining up to 1,000 feet, and an additional 10 percent for each 200 feet in excess of 1,000 feet.

The upper and lower slopes of the terrace should be approximately the same width. All readings taken to determine ridge height and channel cross section shall be taken in a man's heelprint that has had his weight on it.

f. *Terrace grades.*—Channel grades of parallel terraces may be either uniform or variable, with a maximum average grade of 0.5 foot per 100 feet of length. Channel grades may be increased for short distances to improve alignment. Steeper grades, not to exceed 1.0 foot per 100 feet of length, may be used for a continuous length of 200 feet or less, and grades up to 1.5 foot per 100 feet may be used for distances of 100 feet or less at the upper and lower sections of the terrace.

Where terraces are not parallel, the channel grade shall not exceed 0.3 foot per 100 feet, except a grade of not more than 0.5 foot for the last 100 feet of each terrace will be acceptable.

g. *Fills.*—All fills shall be full-bodied, and built to sufficient height so that after settling they shall not be below the normal level of the adjacent terrace ridge.

h. *Completing terrace ends.*—The outlet ends of graded terraces shall have an opening at least equal in square feet to the requirements for channel capacity shown in the terrace dimension table. Adequate openings shall be made before the terrace can be considered as completed.

i. *Outlets.*—The system should be planned so that the terraces have individual outlets upon well-protected pasture, meadow, or range land. Outlets in wooded areas may be satisfactory where slopes are not too steep.

If conditions are unfavorable for this method, the outlets shall be protected by established waterways. The planning technician will determine whether or not it is technically sound to construct the terraces without requiring prior shaping or establishment of vegetation on the outlet.

The design elevation of the water surface in the terrace shall not be lower than the design elevation of the water surface in the outlet, at their junction, when both are operating at design flow.

j. *Removal of obstructions.*—All dead furrows, ditches, or gullies to be crossed shall be filled before construction begins, or as a part of construction. All old terraces, fence rows, and other obstructions that will interfere with the successful operation of the system shall be removed.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee as soon as the terraces have been completed in order that a performance check may be made.

C-5. Constructing diversion terraces to intercept runoff and divert excess water to protected outlets.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Diversion terraces must be constructed following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

Federal cost-sharing will not be allowed under this practice for material moved in excess of that required to construct the diversion terrace to the lines, grades, and dimensions shown on the plans.

FEDERAL COST-SHARE:

a. 7 cents per cubic yard of earth moved where the average cross section of the ridge on a settled basis above natural ground is 14 square feet or more; or

b. \$3.30 per 100 linear feet where the average cross section of the ridge on a settled basis above natural ground is less than 14 square feet.

TECHNICAL RECOMMENDATIONS.—The following technical recommendations apply where the total area draining onto the diversion does not exceed 200 acres. (For drainage areas exceeding the above, special plans and specifications must be developed.)

a. *Grade.*—The grade of diversion terraces may be variable, but the maximum grade must not exceed 0.5 foot per 100 feet unless the water channel is protected from erosion by a vegetative cover or other satisfactory means.

b. *Outlet protection.*—The channel and outlet end of the terrace must be protected against erosion. The planning technician will determine whether or not it is technically sound to construct the terrace without requiring prior work on the outlet. Where it is determined that the outlet work should be done first, the construction of the terrace must be delayed until the outlet can take the runoff safely.

c. *Capacity.*—The capacity of diversion terraces must be adequate to carry the maximum runoff expected to occur on frequency of once in 10 years with a freeboard of not less than 0.5 foot, except that the freeboard may be reduced to 0.3 foot where the drainage area is 20 acres or less.

d. *Cross section.*—The channel may be parabolic, V-shaped, or trapezoidal. The diversion shall be designed to have stable side slopes. The ridge height shall include a reasonable settlement factor. The diversion ridge shall have a minimum top width of 4 feet at the design elevation.

e. *Settlement.*—Where possible, the excavated area should be used in making yardage determination. Where the ridge is used in making the yardage determination, a shrinkage factor of 10 percent will be applied if the ridge is constructed with a fresno, road grader, or maintainer. If any other type of equipment is used in constructing the ridge, a shrinkage factor of 20 percent will be applied.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee as soon as the diversion terrace has been completed in order that a performance check may be made.

C-7. Constructing pipe drops or drop inlets for the protection of outlets and water channels that dispose of excess water.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Pipe structures must be constructed following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

Federal cost-sharing under this practice will not be allowed for pipe used in the transport or distribution of water or for other such purposes primarily for the convenience of the farm operator.

FEDERAL COST-SHARE:

		<i>Per linear foot</i>
a. Pipe (diameter in inches)		
(1)	6	\$0.70
(2)	8	1.05
(3)	10	1.25
(4)	12	1.45
(5)	14	1.65
(6)	15	1.70
(7)	16	1.80
(8)	18	2.00
(9)	20	2.15
(10)	21	2.30
(11)	24	2.60
(12)	30	3.15
(13)	36 or over	3.80
b. Antiseep collars		\$0.88 sq. ft.

TECHNICAL REQUIREMENTS.—a. *Material*.—Pipe used under this practice must be high quality new pipe and must be galvanized, aluminum, or properly treated for long life and must meet the following additional requirements:

- (1) Smooth pipe—14-gage material or heavier.
- (2) Corrugated pipe—16-gage material or heavier.

The heavier gage material is to be used when the technician finds that existing conditions require the use of heavier material for a technically sound installation.

b. *Capacities*.—(1) Where the structure is for protection of a drainage ditch, a runoff 25 percent greater than that for which the ditch is designed shall be used in designing the structure. (2) Where the structure is for protection of a waterway or gully, the runoff expected to occur on frequency of once in 10 years shall be used in designing the structure. (3) Where the structure is to prevent prolonged flow through a vegetated spillway, the structure shall be designed to handle the expected normal prolonged flow. (4) All structures must be provided with emergency or auxiliary spillways where design capacities are less than the runoff expected on frequencies of once in 50 years.

c. *Construction requirements*.—(1) Pipe drops.—The pipe must be installed on a firm foundation. It should empty into an area recessed in the bank of the outlet. This is especially true if the outlet is a flowing stream. The cantilever section must extend to or beyond the toe of the slope except where a headwall is used. The pipe must extend into the bank a minimum distance of two times the overhang. The backfill around the pipe must be well compacted and the finished fill so shaped that overflow of any excess water will not be along the pipe trench. Headwalls should be installed and cutoff walls used along the buried section of the pipe where needed.

(2) Drop inlets.—The pipe must be installed on a firm foundation. Watertight band couples should be used. If standard band couples are used, the joints must be wrapped with bituminous treated burlap or other standard quality material manufactured for this purpose (e.g., closed cell, expanded synthetic rubber gasket) before couples are attached if the drop inlet is used to protect a water storage facility. The backfill around the pipe must be well compacted. At least one antiseep collar should be used. A baffle

wall should be used if the maximum depth of flow over the lip of riser is expected to exceed one-half the diameter of the riser pipe. The riser pipe must extend a minimum of 1 foot below the invert of the barrel and be filled below this point with concrete to serve as a base if the drop inlet is used to protect a water storage facility.

d. *Antiseep collars*.—When antiseep collars are installed with cost-sharing, the material must be of a gage at least as heavy as that of the pipe with which it is used. The location and installation of the collar must be in accordance with plans referred to in the limitations statement of this practice. The collar must extend as much as 2 feet from the pipe.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee as soon as the pipe has been installed in order that a performance check may be made.

C-9(a). Constructing or enlarging permanent open drainage systems to dispose of excess water.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Ditches must be constructed following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

Federal cost-sharing under this practice is limited to those ditches which (a) have a minimum effective depth of 1.5 feet, or (b) in case of enlargement, the cross-sectional area of the original ditch must be increased by at least 6 square feet. Federal cost-sharing for ditches averaging less than 1.5 feet effective depth (drainage field ditches) is authorized under practice C-9 (c).

This practice is not applicable to land other than that devoted to the production of cultivated crops or crops normally seeded for hay or pasture in the area during at least 2 of the last 5 years.

No Federal cost-sharing will be allowed for ditches, the primary purpose of which is to bring additional land into agricultural production, or for cleaning or maintaining a ditch.

Federal cost-sharing will not be allowed under this practice for material moved in excess of that required to construct or enlarge the ditch to the lines, grades, and dimensions shown on the plans.

If the spoils must be spread to permit effective utilization of the drainage system, costs will not be shared under this practice unless the spoils are spread.

Cost-sharing or technical assistance shall not be authorized for draining land described as Wetland Type 3, 4, or 5 in U. S. Department of Interior, Fish and Wildlife Service Circular 39, "Wetlands of the United States", published in 1956.

FEDERAL COST-SHARE: 8 cents per cubic yard of earth moved.

TECHNICAL RECOMMENDATIONS.—a. *Side slopes*.—For all V-type ditches, the side slopes should be reasonably uniform and approximately 4 to 1 and must not be steeper than 3 to 1. The side slopes of other type ditches (flat bottom) should not be steeper than 1½ to 1 and must not be steeper than 1 to 1.

b. *Grade*.—Unless sodded or stabilized by other means, the grade of the ditch should be such that design velocities do not

exceed the following: (1) 4.0 feet per second on stiff clay soils; (2) 2.5 feet per second on sandy loam soils; and (3) 1.5 feet per second on light sandy soils.

c. *Spoil banks*.—(1) *V-type ditches*.—The earth removed from V-type ditches must be spread at the time the ditch is constructed except at places where the ditch is bounded by woods or riceland. The maximum depth of the spread materials may not exceed 1.0 foot for V-type ditches with a cross-sectional area of 27 square feet or less. For larger cross-sectional areas, the depth may be increased proportionately, but in no case may the maximum depth of spread material exceed 3 feet. The side slopes on the field side of the spread material should not be steeper than 15 to 1 and must not be steeper than 10 to 1. The side slopes adjacent to the ditch must not be steeper than 3 to 1. Along woods and ricelands, the unspread spoil banks of V-type ditches must be shaped with smooth sides to permit mowing or disking. Sufficient openings shall be left in the spread material to allow water to enter the ditch.

NOTE: Bulldozer-constructed ditches with less than 20 square feet cross-sectional area will be considered the same as V-type ditches.

(2) *Ditches other than V-type*.—If the spoil banks in open land are not spread at the time of construction, the top and sides of the spoil banks must be shaped and smoothed to permit mowing or disking. Sufficient openings shall be left in spoil banks to allow drainage.

d. *Berm*.—Unless spreading is done at the time the ditch is constructed, a berm must be left between the top edge of the ditch and the edge of the excavated material in accordance with the following:

Average depth of ditch:

	Minimum berm width
2 to 4 feet	4 feet
4.1 to 6 feet	6 feet
Over 6 feet	10 feet

Not more than a 400-foot linear section of the ditch may be used in calculating the average depth of the ditch.

e. *Outlets*.—Each ditch must have an outlet that will permit the ditch to function as designed. Each ditch must be designed to enter into the outlet with minimum of erosion and siltation.

f. *Capacity*.—Each ditch must have a capacity adequate to remove in approximately 24 hours the runoff expected from a storm of 5-year frequency for row crops, and in approximately 48 hours for rice and pasture.

g. *Other*.—In the installation of drainage systems, due consideration shall be given to the maintenance of wildlife habitat.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee as soon as the construction or enlargement work has been finished in order that a performance check may be made.

C-9(b). Spreading spoil banks for the effective utilization of a drainage system.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Spoil banks must be spread following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

No Federal cost-sharing will be allowed under this practice for the disposal of material removed from V-type ditches or from bulldozer-constructed ditches with less than 20 square feet cross-sectional area.

This practice is applicable only to ditches constructed during the current program year which qualify under the limitations applicable to practice C-9(a).

Cost-sharing or technical assistance shall not be authorized for draining land described as Wetland Type 3, 4, or 5 in U. S. Department of Interior, Fish and Wildlife Service Circular 39, "Wetlands of the United States", published in 1956.

FEDERAL COST-SHARE: 3 cents per cubic yard of earth moved from the ditch and spread.

TECHNICAL RECOMMENDATIONS.—a. *Extent of spreading required.*—Where the average cross-sectional area of the excavated material is 27 square feet or less, the material must be spread so that the maximum depth does not exceed 1.0 foot. The maximum depth may be increased proportionately for cross-sectional areas greater than 27 square feet, but in no case may the maximum depth of the spread material exceed 3 feet. The side slopes on the field side of the spread material should not be steeper than 15 to 1 and must not be steeper than 10 to 1. The side slopes adjacent to the ditch must not be steeper than 3 to 1.

b. *Openings.*—Sufficient openings shall be left in the spread material to allow water to enter the ditch.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee as soon as the spreading has been completed in order that a performance check may be made.

C-9(c). Constructing a system of V-type drainage field ditches to dispose of excess water.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Drainage field ditches must be constructed following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

The practice is limited to those areas where adequate outlets for farm drainage have been provided. This practice is not applicable to land other than that devoted to the production of cultivated crops or crops normally seeded for hay or pasture in the area during at least 2 of the last 5 years.

No Federal cost-sharing will be allowed for ditches the primary purpose of which is to bring additional land into agricultural production or for cleaning and maintaining a ditch.

Cost-sharing or technical assistance shall not be authorized for draining land described as Wetland Type 3, 4, or 5 in U. S. Department of Interior, Fish and Wildlife Service Circular 39, "Wetlands of the United States", published in 1956.

FEDERAL COST-SHARE: \$1.50 per 100 linear feet.

TECHNICAL RECOMMENDATIONS.—a. *Side slopes*.—The side slopes should be at least 6 to 1 and must not be steeper than 5 to 1.

b. *Spoil banks*.—The earth moved must be spread flat enough so that the drainage field ditches may be safely crossed with cultivating equipment. Usually, this will require that the spread material have side slopes not steeper than 10 to 1. The spoil must be placed on the downhill side of the ditch or in such a manner as not to block drainage from rows or sown crops.

c. *Outlets*.—Each drainage field ditch must have an outlet that will permit the ditch to function as planned with a minimum of erosion and siltation.

d. *Depth*.—The depth of drainage field ditches in a system must average at least 0.8 foot.

e. *Spacing*.—Drainage field ditches should be spaced to provide good drainage based on topographic conditions and the texture of the soil to be drained. This usually varies from 300 feet in the heavier soils to 1,000 feet in lighter soils.

f. *Other*.—In the installation of drainage systems, due consideration shall be given to the maintenance of wildlife habitat.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee as soon as the ditches have been completed in order that a performance check may be made.

C-11. Shaping or land grading to permit effective surface drainage.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—Shaping or land grading must be accomplished following plans or standards which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

Drainage field ditches needed for adequate drainage must be constructed for this practice to be eligible for cost-sharing.

Land shaping is applicable only to land containing small depressed areas and on which adequate drainage is either otherwise provided, or where application of this practice is a practical step in the planned drainage program for the area to be shaped. No Federal cost-sharing will be allowed for routine floating or for any shaping which is performed through farming operations in connection with land preparation for planting or cultivation of crops.

Land grading is applicable only to land where topography is such that the application of this practice is a practical step in the planned drainage program for the area to be graded.

Cost-sharing for land grading is not authorized under this practice unless an estimated 100 cubic yards or more of earth per acre is to be moved.

Cost-sharing for land shaping is not authorized under this practice unless an estimated 60 cubic yards or more of earth per acre is to be moved.

The land grading for drainage practice shall be planned in such a way that a practical irrigation system can be installed without re-grading.

Costs may not be shared under this practice if costs are shared under practice C-13 for the same area. Neither may costs be shared under both cost-share rates "a" and "b" of this practice on the same area.

No Federal cost-sharing will be allowed for shaping or land grading on land which was not devoted to the production of cultivated crops or crops normally seeded for hay or pasture in the area during at least 2 of the last 5 years.

Cost-sharing or technical assistance shall not be authorized for draining land described as Wetland Type 3, 4, or 5 in U. S. Department of Interior, Fish and Wildlife Service Circular 39, "Wetlands of the United States", published in 1956.

FEDERAL COST-SHARE:

a. Land shaping—\$5.00 per acre on which land shaping was accomplished.

b. Land grading—The smaller of (1) 8 cents per cubic yard of earth moved, or (2) the number of acres in the planned segments of the field(s) graded multiplied by \$35.

TECHNICAL RECOMMENDATIONS.—Earth should be moved by scrapers, bulldozers, land levelers, or other earthmoving equipment of similar type. The land should be plowed or disked and the entire area finish graded by a land leveler or grader. Shaping or grading must be such that water will not be impounded more than 0.1 foot deep at any place.

Where land grading is performed, finished grades must not vary from planned grade by more than 0.1 foot. Annual crops should be planted on the land the first year to allow fills to settle and permit smoothing before perennial crops are planted. Maximum depth of cut should not exceed one-half the depth of topsoil, unless the cut areas are treated to restore productivity. The drainage system installed on the land should be designed to hold erosion to a minimum, recommended grades varying between a maximum of 0.50 foot and a minimum of 0.10 foot per 100 feet.

PERFORMANCE.—This practice must have been carried out in a workmanlike manner and in accordance with the requirements of the technical recommendations and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee when the practice has been completed in order that a performance check may be made.

C-12(a). Reorganizing irrigation systems to conserve water and prevent erosion.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS AND PRELIMINARY REQUIREMENTS.—The reorganization must be accomplished following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

No Federal cost-sharing will be allowed for reorganizing an irrigation system if the primary purpose of the reorganization is to bring additional land under irrigation or for reorganizing a system which was not in use during at least 2 of the last 5 years.

No Federal cost-sharing will be allowed for cleaning or maintaining a ditch, dike, or lateral.

Federal cost-sharing will not be allowed under this practice for material moved or placed in excess of that required to meet the lines, grades, and dimensions shown in the plans.

FEDERAL COST-SHARE: 8 cents per cubic yard of earth moved.

TECHNICAL RECOMMENDATIONS.—a. *Capacity.*—The capacity of the ditch must be adequate to safely handle the flow of water required for efficient irrigation.

b. *Slide slopes.*—1. Irrigation field ditches.—(a) *Excavation.*—The side slopes of all excavations should be such that the banks will not slough. On heavy (clay) soils, the side slopes must not be steeper than $\frac{1}{2}$ to 1. On other soils, the side slopes must not be steeper than 1 to 1. (b) *Levees.*—The side slopes of levees must not be steeper than $1\frac{1}{2}$ to 1, both inside and outside calculated on a settled basis.

2. Re-lift and slit ditches.—The side slopes of the ditches should not be steeper than $1\frac{1}{2}$ to 1 and must not be steeper than 1 to 1.

c. *Freeboard.*—The height of fill above water level when the ditch is flowing at design elevation must not be less than 1 foot measured on a settled basis.

d. *Settlement.*—At least 20 percent of the height of fill shall be allowed for settlement.

e. *Top width.*—The top width of fills in feet must not be less than one-fourth of the settled height plus 2 feet.

f. *Berm.*—1. Irrigation field ditches. The minimum berm width of levees constructed by dragline, measured between the edge of the borrow and the toe of the levee shall be:

Settled levee height (Feet)	Minimum width (Feet)
3.0 or less	2
3.1 to 5.9	3
6.0 to 8.0	4
Over 8.0	$\frac{1}{2}$ settled levee height

The berm may be eliminated where the side slopes of the levee and the borrow are $2\frac{1}{2}$ to 1 or flatter. Where old levees are to be enlarged, the berm may be eliminated if, in the opinion of the technician, neither the levee nor the borrow will slough.

2. Re-lift and slit ditches.—Unless spreading is done at the time the ditch is constructed, a berm must be left between the top edge of the ditch and the edge of the excavated material in accordance with the following:

Average depth of ditch:	Minimum berm width
2 to 4 feet	4 feet
4.1 to 6 feet	6 feet
Over 6 feet	10 feet

Unspread spoil banks must be shaped to a flat top with smooth sides.

g. *Protection of fills against erosion.*—When ditches and fills cross sandy soils, the fill slopes should be protected against erosion by vegetative means.

h. *Appurtenant structures.*—Water control structures shall be installed at planned locations and at elevations and grades which will permit proper functioning of the system.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee when the structure has been completed in order that a performance check may be made.

C-12(b). Reorganizing farm irrigation systems (using underground pipe) to conserve water and prevent erosion.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS AND PRELIMINARY REQUIREMENTS.—The reorganization must be accomplished following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice. The manufacturer of pipe which is offered for use in performing this practice shall, before any such pipe is installed under the current program, furnish the State Conservationist, Soil Conservation Service, a statement of the type and, where applicable, the brand name of pipe which is offered to farmers or contractors for use in performing the practice. The manufacturer shall furnish additional information as indicated below for review by the State Conservation Engineer of the SCS for a determination as to whether the practice specifications can be met by use of the material:

Plastic pipe.—A current (not more than 1 year old) certificate executed by a recognized testing laboratory or an authorized representative of a pipe association stating that the pipe has been tested and meets the standards referred to in part "1,a" under technical recommendations of this practice.

Rubber gasket concrete.—A current (not more than 1 year old) certificate executed by a recognized testing laboratory or an authorized representative of a pipe association stating that the pipe has been tested and meets or exceeds the specifications set out in Soil Conservation Service National Specifications for Non-reinforced Concrete Irrigation Pipe with Rubber Type Gasket Joints.

Asbestos cement pipe.—The material, design, and manufacturer's installation specifications for irrigation pipelines must be submitted for approval of the State Conservation Engineer of the Soil Conservation Service.

A current (not more than 1 year old) certificate executed by a recognized testing laboratory or an authorized representative of a pipe association or the manufacturing company stating that the pipe has been tested and meets or exceeds the specifications set out in specifications for asbestos cement irrigation pipe which have been approved by the State Conservation Engineer, SCS, as set out above must be submitted.

Cost-sharing will be limited to those materials which are found to meet the requirements set out in this practice for the respective type of pipe.

Federal cost-sharing under this practice will be limited to permanent underground pipeline irrigation systems installed with plastic, rubber gasket concrete, or asbestos cement pipe. No Federal cost-sharing will be allowed for reorganizing an irrigation system if the primary purpose of the reorganization is to bring additional land under irrigation, or for reorganizing a system which was not in use during at least 2 of the last 5 years.

No Federal cost-sharing will be allowed for short sections of pipeline used in connection with surface irrigation ditches or canals in

crossing roadways, drainage ditches, natural drains, or other obstructions.

Federal cost-sharing will not be allowed under this practice for material placed in excess of that required to meet the lines, grades, and dimensions shown in the plans.

FEDERAL COST-SHARE:

Pipe (diameter in inches)	Per linear foot
(1) 6	\$0.88
(2) 8	.97
(3) 10	1.20
(4) 12	1.45
(5) 14	1.60
(6) 15	1.65
(7) 16	1.80
(8) 18	2.10

TECHNICAL RECOMMENDATIONS.—1. The following specifications apply to permanent underground irrigation pipeline systems constructed with plastic pipe:

a. *Quality of pipe.*—(1) Only new pipe of uniform high quality will be used. (2) Pipe shall be rigid plastic pipe as defined in American Society for Testing Materials Designation D-883-58T. It shall meet the following limiting physical property characteristics:

Property	ASTM Test Method	Unit	Value
Modulus of elasticity	D-638-58T	p.s.i.	Not less than 100,000
Ultimate tensile strength	D-638-58T	p.s.i.	Not less than 3,000
Impact strength, Izod 77F	D-256-56	ft.lb./in.	Not less than 1.0
Elongation	D-638-58T	%	Not less than 10%
Water absorption, 24 hour net gain.	D-570-57T	%	Not more than 1%

Copies of these standards may be obtained from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pennsylvania.

The pipe shall be of uniform composition and generally of good quality without bubbles. Pipe with unusual surface striations, thick or thin spots, or other defects of a nature which would depart from good commercial standards of performance and appearance will not be accepted.

In addition, the physical characteristics of the material shall be such as to permit the installation to meet the guarantee requirements listed below.

b. *Design.*—Pipelines, including all appurtenances such as stands, vents, inlets, outlets, drains, traps, and gates, will be designed according to design criteria contained in Soil Conservation Service Technical Release No. 11.

c. *Size and location of pipeline and appurtenant structures.*—The pipeline and appurtenant structures shall be designed by a qualified engineer and shall have sufficient capacity to meet service demands without the use of pressures which will produce tensile stresses greater than one-fifth of the ultimate tensile strength of the pipe material. The line shall be located according to a plan which provides for inlets, outlets, drains, traps, vents, and control valves or gates, as needed.

d. *Joints and connections.*—A watertight joint having a strength equal to that of the pipe shall be provided which will leave the inside of the pipeline and appurtenances free of any obstruction which would reduce the capacity below design specifications. When steel

tees, ells, or risers are used, they must be adequately protected from corrosion by wrapping with plastic tape, coating with asphaltic compounds, or other approved corrosion preventatives. Clamps and steel fittings may either be stainless steel or steel properly protected from corrosion.

e. *Placement*.—Pipe shall be placed deep enough below the land surface to protect it from hazards imposed by traffic crossing, farm operations, freezing temperatures, or soil cracking. Thirty-inch minimum cover shall be provided except in soils subject to deep cracking, where the cover shall be a minimum of three feet. Extra fill may be placed over the pipeline to provide the minimum depth of cover if the top width of the fill is not less than 10 feet and the side slopes are not steeper than 6 to 1. (Exception: In areas where freezing and soil cracking are not hazards, pipelines may be placed at lesser depths if they are protected from damage by traffic and tillage implements with a fence or other surface barrier along the pipeline.)

The minimum width of the trench shall be at least 6 inches greater than the diameter of the pipe being installed. When trenches are excavated in soils containing rock or other hard materials which might damage pipe or coating material, they shall be excavated slightly deeper than required; and then filled to grade with sand or fine earth.

f. *Testing*.—Testing should ordinarily be accomplished before backfilling. The pipe should be filled with water, taking care to bleed the air and slowly build the pressure up to its working value. No leakage should be apparent at any solvent welded joint, and the maximum permissible leakage of clamp-type joints shall be 0.75 gallons per day per linear foot of joint.

It shall be demonstrated that all pipelines function properly at design capacity. At or below design capacity there shall be no objectionable surge or water hammer. To be objectionable, there shall be either (1) continuing, unsteady delivery of water, (2) damage to the system, or (3) detrimental overflow from vents or stands.

Pipelines may be tested for leaks by observing their normal operation at any time after a period of 2 weeks of continuous wetting. All visible leaks shall be repaired. Maximum allowable losses shall be:

$$L = \frac{V}{10d}$$

Where L = Allowable leakage per day in gallons

V = Volume of pipeline in cubic feet

d = Average diameter of the pipe in feet.

g. *Backfilling*.—The pipeline should ordinarily be tested and all leaks repaired prior to backfilling. The pipe must be kept full during the backfilling operation. The fill immediately surrounding the pipe shall be loose material free from stones or rocks. This material shall be compacted along the sides of the pipe by mechanical means, or the fill may be puddled in place. Puddling is accomplished by first filling the trench at least 6 inches over the pipe, and adding water in sufficient quantity to saturate the fill. The balance of the backfill may then be placed dry. Care must be taken not to deform the pipe during the backfilling operation.

Any special requirements of the pipe manufacturer or vendor shall be strictly observed.

h. *Guarantee.*—The vendor shall be required to furnish the farmer a written guarantee for repair or replacement of the pipeline with the following minimum requirements: (1) a guarantee against rot, rodent damage, electrolytic corrosion, and failure due to weathering caused by climatic factors, for a period of not less than 5 years after installation. (2) A guarantee against defective materials and workmanship and against deformation that would cause the minor axis of the deformed section to be less than 90 percent of the original diameter for a period of not less than 2 years after installation. The written guarantee supplied by the vendor shall specifically identify the manufacturer of the material and will certify that the material and installation meet the requirements of this specification.

2. The following specifications apply to permanent underground irrigation pipeline systems constructed with rubber gasket concrete pipe:

a. *Quality of pipe.*—(1) Only new pipe of uniform high quality will be used. (2) All pipe shall comply with Soil Conservation Service National Specifications for Non-Reinforced Concrete Irrigation Pipe with Rubber Type Gasket Joints.

b. *Design.*—Pipelines, including all appurtenances such as stands, vents, inlets, outlets, anchors, and gates, will be designed according to design criteria contained in Soil Conservation Service National Standards for Non-Reinforced Concrete Irrigation Pipe with Rubber Type Gasket Joints.

c. *Joints and connections.*—Rubber gasket joints shall be used. All joints shall be constructed to leave the inside of the pipeline and appurtenances free of any obstruction which would reduce capacity below design specifications. Joint assembly shall be made according to the Soil Conservation Service National Specifications for Non-Reinforced Concrete Irrigation Pipe with Rubber Type Gasket Joints.

d. *Placement.*—The pipeline shall be placed deep enough below the land surface to permit covering the pipe a minimum of 2 feet unless shallower covering is specified due to unusual conditions such as rocky areas. If shallower covering is specified, the line shall be protected from damage by vehicular traffic. Greater depths of cover shall be specified when local conditions indicate a need.

Where trenches are excavated in soils containing rock or other hard materials, or in soils subject to appreciable swelling and shrinking on wetting or drying, or where the trench bottom is unstable, the trenches shall be over-excavated and backfilled with selected materials to sufficient depth to provide a suitable base. If water is in the trench, that water shall be drained away, and laying of pipe postponed until a suitable base has been obtained.

e. *Anchors.*—Abrupt changes in pipeline grade or alignment require either (1) a stand of diameter greater than the pipeline, or (2) an anchor to absorb any axial thrust of the pipeline. An abrupt change shall be considered to be an angle greater than 15 degrees. Anchors shall be such as to eliminate damaging axial movement.

The pipe shall be clean and wet, to provide a good bond between anchor and the pipe.

f. *Testing*.—It shall be demonstrated that all pipelines function properly at design capacity. At or below design capacity, there shall be no objectionable surge or water hammer. To be objectionable, there shall be either (1) continuing, unsteady delivery of water, (2) damage to the system, or (3) detrimental overflow from vents or stands.

Pipelines may be tested for leaks by observing their normal operation at any time after a period of 2 weeks of continuous wettings. All visible leaks shall be repaired. Losses from pipelines shall not exceed 0.1 cubic foot per square foot of inside surface in 24 hours on sites with free underdrainage or 0.03 cubic foot per square foot of inside surface in 24 hours on sites with restricted underdrainage.

g. *Guarantee*.—The vendor shall be required to furnish the operator a written guarantee for repair or replacement of the pipeline against defective materials and workmanship for a period of not less than one year after installation. The written guarantee supplied by the vendor shall specifically identify the manufacturer of the material and will certify that the material and installation meet the requirements of the practice.

3. The following specifications apply to permanent underground irrigation pipeline systems constructed with asbestos cement pipe:

a. *Quality of pipe*.—(1) Only new pipe of uniform high quality will be used.

(2) Pipe and coupling shall be composed of an intimate mixture of portland cement or portland possolana cement and asbestos fiber, with or without the addition of curing agents, shall be free of organic substances, and shall be formed under pressure and thoroughly cured.

(3) Each pipe shall be properly machined on each end so as to facilitate joining the pipe sections without damage or displacing the gasket and to automatically provide a definite separation of pipes in each coupling assembly.

(4) Each standard, random, or short length of pipe and each coupling for the corresponding pipe shall have sufficient strength to hold an internal hydrostatic test equal to three times the design working pressure.

(5) Each standard length of pipe in sizes 8-inch in diameter or less shall be tested by the manufacturer for sufficient flexural strength to withstand, without failure, total loads as prescribed by the manufacturer's standard specifications as approved by the State Conservation Engineer.

(6) When tested in accordance with the ASTM three-edge bearing method, the pipe shall have the crushing strength as prescribed by the manufacturer's standard specifications as approved by the State Conservation Engineer.

b. *Workmanship and finish*.—(1) The interior surface of the pipe shall have a smoothness sufficient to provide a minimum roughness coefficient of $n = 0.01$ for use in Manning's formula.

(2) Machined ends of the pipe that receive the couplings shall be free from dents and gouges which will affect the tightness of the joint.

c. *Marking*.—Each standard and random length of pipe shall be marked with the manufacturer's trade name, pipe size, type, and date of manufacture. Each coupling shall be marked with the nominal size and type.

d. *Design*.—Pipelines, including all appurtenances such as stands, pressure relief valves, vents, inlets, outlets, anchors, and gates, will be designed in accordance with standards of the Soil Conservation Service.

e. *Joints and connections*.—Rubber gasket joints shall be used. All joints shall be constructed to leave the inside of the pipeline and appurtenances free of any obstruction which would reduce capacity below design specifications. Joint assembly shall be made according to the recommendations of the gasket manufacturer.

f. *Pressure relief requirements*.—When pumps deliver water directly into a closed pipeline or when pipelines deliver water to points of higher elevation and the line is protected from reversal of flow by check valves, the pipeline must be protected by having a pressure relief valve, surge chamber or open stand adjacent to and downstream from the pump and/or check valve.

These pressure relief appurtenances shall be of sufficient size to prevent occurrence of pressures in the pipeline in excess of the maximum permissible working head for the pipe.

g. *Vent requirements*.—Air valves or vents shall be placed at all high points in the line and at points where air is apt to accumulate. Accumulations ordinarily occur at breaks in grade where the slope of the pipe increases in the direction of flow. Vents shall be provided at points where there are changes in grade downward in the direction of flow of more than ten degrees. Additional vents shall be specified for those locations where, in the judgment of the engineer, they are needed.

Air valves or vents at summits shall have a minimum opening of one-eighth the diameter of the line; air valves or vents on breaks in slope shall have a minimum diameter of one-twelfth the diameter of the line.

h. *Placement*.—The pipeline shall be placed deep enough below the land surface to permit covering the pipe a minimum of 2 feet unless shallower covering is specified due to unusual conditions such as rocky areas. If shallower covering is specified, the line shall be protected from damage by vehicular traffic. Greater depths of cover shall be specified when local conditions indicate a need.

Where trenches are excavated in soils containing rock or other hard materials, or in soils subject to appreciable swelling and shrinking on wetting or drying, or where the trench bottom is unstable, the trenches shall be over-excavated and backfilled with selected materials to sufficient depth to provide a suitable base. If water is in the trench, that water shall be drained away, and laying of pipe postponed until a suitable base has been obtained.

i. *Anchors*.—Anchors or thrust blocks must be installed where abrupt changes in alignment or grade occur, at locations of tees, reducers, dead-ends, and valves where thrusts may develop. An abrupt change shall be considered to be an angle greater than 15 degrees. The size and type of anchor depends on pressure, pipe size, kind of soil and type of fitting.

j. *Backfilling*.—The earth used to surround and cover the pipe for approximately six inches shall be free of stones or clods which might injure the pipe. All backfill shall be placed in such a manner as to insure thorough consolidation without injury to the pipe.

k. *Testing*.—It shall be demonstrated that all pipelines function properly at design capacity. At or below design capacity, there shall be no objectionable surge or water hammer. To be objectionable, there shall be either (1) continuing, unsteady delivery of water, (2) damage to the system, or (3) detrimental overflow from vents or stands.

Pipelines may be tested for leaks by observing their normal operation at any time after a period of 2 weeks of continuous wettings. All visible leaks shall be repaired. Losses from pipelines shall not exceed 0.1 cubic foot per square foot of inside surface in 24 hours on sites with free underdrainage or 0.03 cubic foot per square foot of inside surface in 24 hours on sites with restricted underdrainage.

l. *Guarantee*.—The vendor shall be required to furnish the operator a written guarantee for repair or replacement of the pipeline against defective materials and workmanship for a period of not less than one year after installation. The written guarantee supplied by the vendor shall specifically identify the manufacturer and the type of the material and will certify that the material and installation meet the requirements of the practice.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations stated above.

The farm operator, or other person sharing in the practice, must notify the county committee as soon as the practice has been completed in order that a performance check may be made.

C-13. Leveling irrigable land for more efficient use of irrigation water to prevent erosion.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS AND PRELIMINARY REQUIREMENTS.—Leveling must be accomplished following plans or standards which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

This practice is applicable only to land which, after leveling, can be irrigated without erosion damage. No Federal cost-sharing will be allowed for floating, smoothing land solely to eliminate surface irregularities caused by the operation of tillage or harvesting equipment, to restore grade, or for leveling land if the primary purpose of the leveling is to bring additional land into agricultural production. The practice is not applicable in connection with irrigable land unless suitable and adequate water is available or is to be made available.

Cost-sharing is not authorized under this practice where it is estimated that movement of less than 100 cubic yards of dirt per acre is required.

No Federal cost-sharing will be allowed for leveling land if the primary purpose of the leveling is to bring into agricultural production land which was not devoted to the production of cultivated crops or crops normally seeded for hay or pasture in the area during

at least 2 of the last 5 years. Drainage field ditches needed for adequate drainage must be constructed for this practice to be eligible for cost-sharing.

FEDERAL COST-SHARE: The smaller of (1) 8 cents per cubic yard of earth moved, or (2) the number of acres in the planned segments of the field(s) leveled multiplied by \$35.

TECHNICAL RECOMMENDATIONS.—Earth should be moved by scrapers, bulldozers, land levelers, or other earthmoving equipment of a similar type. The land should be plowed or disked and the entire area finish graded by a land leveler or grader. Leveling must be such that water will not be impounded more than 0.1 foot deep at any place.

Finished grades must not vary from planned grade by more than 0.1 foot. In the case of "mound pushing", the finished grade must coincide with the general topographic pattern without abrupt changes that will prevent uniform application of water. Annual crops should be planted on the land the first year to allow fills to settle and permit smoothing before perennial crops are planted. Maximum depth of cut should not exceed one-half the depth of topsoil unless the cut areas are treated to restore productivity. The irrigation system installed on the land after leveling should be designed to hold erosion to the minimum.

For furrow irrigation of row crops, the grade should not exceed 0.3 foot per 100 feet.

PERFORMANCE.—This practice must have been carried out in a workmanlike manner and in accordance with the requirements of the technical recommendations and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee when the practice has been completed in order that a performance check may be made.

C-14. Constructing or enlarging dams for irrigating water.

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—The purpose of this practice is to conserve agricultural water or to provide water necessary for the conservation of soil resources. Reservoirs must be constructed following detail plans which meet the approval of a technician of the Soil Conservation Service authorized to approve the practice.

No Federal cost-sharing will be allowed for enlargement under this practice, except where the original capacity of the reservoir is increased by at least 20 percent.

No Federal cost-sharing will be allowed for constructing or enlarging dams or reservoirs, the primary purpose of which is to bring into agricultural production land which was not devoted to the production of cultivated crops or crops normally seeded for hay or pasture in the area during at least 2 of the last 5 years.

No Federal cost-sharing will be allowed for enclosed reservoirs with average storage depths of less than 3.5 feet.

No Federal cost-sharing will be allowed for cleaning or maintaining existing structures.

No Federal cost-sharing will be allowed for material moved or placed in excess of that required to meet the lines, grades, and dimensions specified in the plans.

FEDERAL COST-SHARE:

a. 8 cents per cubic yard of earth moved and used in the dam.

b. Drop inlets, if needed (Federal cost-sharing under this provision is limited to installations cited in the second paragraph in item "j" of the technical recommendations):

Pipe (diameter in inches)	Per linear foot
(1) 6	\$0.50
(2) 8	.75
(3) 10	.90
(4) 12	1.00
(5) 14	1.15
(6) 15	1.20
(7) 16	1.25
(8) 18	1.40
(9) 20	1.55
(10) 21	1.60
(11) 24	1.85
(12) 30	2.25
(13) 36 or over	2.70
c. Antiseep collars	\$0.63 sq. ft.

TECHNICAL RECOMMENDATIONS.—The following specifications apply to (1) enclosed reservoirs where the maximum height of fill does not exceed 15 feet, and (2) reservoirs with outside drainage where the maximum height of fill does not exceed 20 feet or the storage capacity does not exceed 50 acre-feet. (For reservoirs which exceed the above fill heights or storage capacity, special plans and specifications must be developed.)

a. *Side slopes.*—The side slopes of the dam should not be steeper than 3 to 1 on the inside and 2 to 1 on the outside, calculated on a settled basis, except that on enlargements, outside slopes that are not eroding need not be reworked. On an unsettled basis, a reservoir will be acceptable with respect to side slopes when all of the following conditions are met: (1) The inside slope is not steeper than (a) 2.5 to 1, where the allowance for settlement is less than 20 percent, (b) 2.1 to 1, where the allowance for settlement is 20 percent or more; (2) the outside slope is not steeper than (a) 1.5 to 1, where the allowance for settlement is 20 percent or less, (b) 1.3 to 1, where the allowance for settlement is greater than 20 percent; and (3) the planned cross section with allowance for settlement can be superimposed upon and within the plotted cross section of the completed dam.

b. *Top width.*—The minimum top width must not be less than indicated below:

Height of dam above normal ground level:	Top width
6 feet or less	6 feet
Over 6 feet but not over 11 feet	8 feet
Over 11 feet but not over 18 feet	10 feet
Over 18 feet but not over 20 feet	12 feet

c. *Spillway.*—Reservoirs with outside drainage must have a spillway adequate to carry maximum outflow expected on frequency of once in 50 years. A vegetated spillway must be wide enough to carry this expected flow at a depth not exceeding 2 feet and velocity not exceeding 8 feet per second. All spillways must be protected against erosion by the use of vegetation or structures, unless they are located on a natural formation such as limestone, sandstone, or conglomerate that will not erode under the designed velocity.

Where drainage areas exceed 50 acres and spillways are located on erosive soils or exceed 75 acres and spillways are located on erosion-resistant soils, vegetated spillways must be protected by the installation of a pipe conduit that will provide temporary flood storage, between the conduit inlet and the spillway elevation, adequate to retain a minimum runoff of $\frac{1}{2}$ inch from the entire drainage area. Any exception to these requirements must be approved by an engineering specialist of the Soil Conservation Service.

Earth moved in excavating the spillway shall not be considered as earth moved in constructing the dam unless the earth was used in the dam or the wing of the spillway.

d. *Freeboard*.—(1) Reservoirs enclosed by fill on all sides.—The lowest point along the top of the settled fill must be at least 2 feet higher than the planned water surface in the reservoir. An overflow facility may be installed to help maintain the freeboard.

(2) Reservoirs with outside drainage.—The lowest point along the top of the settled dam must be at least 2 feet higher than the water surface in the spillway when it is flowing at the depth for which it was designed, except where the surface area of the reservoir is one acre or less and the drainage area not more than 20 acres. In these latter cases, the freeboard may be reduced to one foot, provided the vertical distance between the floor of the spillway and the top of the dam at the lowest point is not less than 2 feet.

e. *Settlement*.—Allowance for settlement will be at least 10 percent. This will be increased to at least 15 percent for dams constructed with bulldozers and to at least 20 percent for dams constructed with draglines.

f. *Protection of fills against erosion*.—(1) General.—The entire downstream slope of the fill and the upstream slope above the waterline should be seeded or sodded to perennial vegetation.

(2) Protection from wave damage.—Where the surface area of the reservoir exceeds 5 acres, the inside slope should be protected from wave damage by a false berm (a minimum of 8 feet in width) located near the waterline, or be protected by riprap, or the width of the dam at the planned waterline must be increased a minimum of 4 feet. This increase in width may be obtained by increasing the crown width and/or freeboard height or by a reduction in the steepness of the side slopes. Any exception to these requirements must be approved by an engineering specialist of the Soil Conservation Service.

g. *Foundation preparation*.—The entire base of the dam must be cleaned of all trees, stumps, limbs, and roots so that an adequate bond will be obtained between the fill and the base. This material must be pushed outside the limits of the base of the dam. The upper layer of topsoil should be stockpiled and spread over the completed dam and spillway to help in getting vegetation established. Where the site is overlaid by permeable soil material, a core trench must be excavated at least 4 feet wide and deep enough to penetrate impervious material. Steep banks of gullies, streams, etc., must be sloped so that they are not steeper than 2 to 1 for the base width of the fill.

Earth moved in constructing the core trench shall be considered as earth moved in construction of the dam.

h. *Berm*.—The berm may be variable. Where a fill is constructed adjacent to a borrow pit and the side slopes of the excavation are steeper than 2.5 to 1, the minimum distance between the adjacent toe of the fill and the base of the excavation must be at least 2.5 times the depth of the excavation.

i. *Construction requirements*.—(1) Reservoirs enclosed by fill on all sides.—The fill material shall be placed in such manner that percolation of water through the fill will be prevented.

(2) Reservoirs with outside drainage.—The fill material must be obtained from selected borrow areas meeting the approval of the designated technician. The material should be placed in the fill in uniform layers not more than approximately 12 inches thick and the equipment so routed as to give the best compaction practicable. Where bulldozer equipment is used, the material in the downstream portion of the fill should be compacted by running the equipment lengthwise of the dam at intervals. This should be done at least once for each 24 to 30 inch lift. Other methods which will give the equivalent compaction will be satisfactory. Where there is variation in the material, the more impermeable material should be used in the core and in the upstream portion of the fill and the less desirable material in the downstream portion.

j. *Appurtenances*.—It is recommended that a pipe of sufficient diameter be installed through the lower portion of the fill to provide for draining the reservoir and where feasible for supplying the water for irrigation. The pipe must be placed through the fill in accordance with plans and specifications which specify the size of pipe, number and location of antiseep collars, and the elevation at which the pipe shall be located. The fill material should be thoroughly compacted around the pipe to prevent seepage. Metal pipe must be coated or painted with asphalt or other preservative material prior to installation. Other pipe of materials such as reinforced concrete or asbestos cement may be used provided watertight joints are used and provided the pipeline is cradled in concrete.

In instances where spring flow or continuous flow after heavy rainfall is encountered, a trickle spillway in the form of metal or tile pipe should be installed at least 6 inches below spillway elevation to protect the spillway from erosion. Trickle spillways or draw-down tubes must be installed in accordance with plans and specifications which specify pipe size and location; number and location of antiseep collars; and method of placement through the fill. Federal cost-sharing may be approved for drop inlets and required antiseep collars, where needed. To be eligible for Federal cost-sharing, the drop inlets and antiseep collars must meet the specifications, technical requirements, and performance requirements of practice C-7.

Fencing of dams and reservoirs is often advantageous to protect the embankment from excessive trampling; to protect vegetated spillways; to develop and protect food and cover around pond edges for wildlife; and to prevent damage to fish production. Due consideration should be given this in planning the water supply and fencing is recommended where it is needed.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee when the structure has been completed in order that a performance check may be made.

CONSERVATION PRACTICES WITH BENEFITS OF LIMITED DURATION—generally requiring periodic repetition

D. Practices Primarily For Establishing Temporary Protective Vegetative Cover

D-1(a). Establishment of vegetative cover in the fall of 1963 for winter protection from erosion.

The practice limitations, rates of cost-sharing, technical recommendations, and performance requirements applicable to practice D-1(b) in the 1963 Arkansas State ACP Handbook apply to this practice.

D-1(b). Establishment of vegetative cover in the fall of 1964 for winter protection from erosion.

LIMITATIONS.—Cost-shares paid under this practice shall be refunded if the cover is not maintained in 1965 until the date specified in the county handbook. This practice is not applicable to land on which there is an existing vegetative cover of perennial grasses and/or perennial legumes.

FEDERAL COST-SHARE:

a. Seeding:

<i>Plants</i>	<i>Per-acre seeding rate (pounds)</i>	<i>Federal cost-share per pound</i>
1. (Not used in 1964.)		
2. Common vetch ¹	25-40	\$0.04
3. Hairy vetch ¹	20-30 .....	.085
4. Williamette vetch ¹	25-40 .....	.035
5. Austrian Winter peas ¹	30-40 .....	.035
6. Singletary or rough peas (scarified) ¹	25-35 .....	.065
7. Singletary or rough peas (not scarified) ¹	40-50 .....	.06
8. Reseeding or common crimson clover ¹	15-30 .....	.12
9. Bur-clover (hulled)	15-20 .....	.22
10. Bur-clover (in bur)	50-100 .....	.07
11. Oats	96-128 .....	.02
12. Rye	84-112 .....	.02
13. (Not used in 1964.)		
14. Ryegrass	25-35 .....	.05
15. Oats and legume mixture	64-96 ²	(3)
16. Rye and legume mixture	56-84 ²	(3)
17. (Not used in 1964.)		
18. Ryegrass and legume mixture	15-20 ²	(3)

¹ Winter legume seed in a legume mixture may be used; however, only that part of the mixture which is made up of winter legumes approved for use in the county will be considered in determining the quantity of winter legume seed used. The total quantity of approved winter legume seed in the mixture will be considered to be that winter legume in the mixture which has the lowest Federal cost-share per pound. All requirements for that winter legume must be met.

² Rates shown above are for the small grain or ryegrass; in addition, one of the following legumes shall be seeded:

Hairy vetch	10-15 pounds
Crimson clover	8-15 pounds
Common vetch	15-20 pounds
Austrian Winter peas	15-20 pounds
Singletary peace (scarified)	20-30 pounds
Singletary peace (unscarified)	25-35 pounds

³ Same as stated above for the small grain and applicable legume.

b. Fertilizer.—\$0.045 per pound of available plant food if a fertilizer containing nitrogen is required; \$0.035 per pound of available plant food if no nitrogen is required.

Costs may be shared only for the amount of fertilizer, if any, required for successful establishment of the practice. (See technical recommendations of this practice for manner in which amount of fertilizer required is to be determined.)

TECHNICAL RECOMMENDATIONS.—In establishing the vegetative cover under this practice, the seedlings used shall be those selected from the above list which are recommended as adapted to the area and to the soils where the cover is to be established and which will best accomplish the objectives of the practice. County handbooks shall specify the date in 1965 to which the cover must be maintained on the land.

Vetches, Austrian Winter peas, Singletary peas, bur-clover (hulled), and crimson clover should be artificially inoculated at the time of planting.

a. *Seedbed preparation.*—The seedbed shall be prepared in such manner as to be in accordance with recognized sound farming practices for the particular seeding under the conditions existing on the area on which the cover is to be established.

b. *Seeding.*—Seedlings at less than the lowest rate shown under the Federal cost-share will not qualify for cost-sharing. Any seedlings in excess of the highest specified rates will not increase the amount of cost-sharing for the practice. County handbooks will specify the opening and closing dates for time of planting.

c. *Fertilizer requirements.*—(1) Determination as to whether fertilizer is required.—The county committee shall determine whether fertilizer is required for successful establishment of the cover. Such determination should be based on a soil test showing minimum requirements for successful establishment of the cover, if one is available, otherwise, the determination as to whether fertilizer will be required shall be based on other information known by or made available to the committee, such as productivity of the soil of the area or in the general locality where the cover is to be established; fertilizer applied to other crops grown on the land during the year; usual fertilizer requirements for the cover to be established; or any other information which is indicative of whether fertilizer is required to assure successful establishment of the cover.

(2) Determination of quantity of fertilizer required.—Cost-shares shall be approved only for the quantity, if any, determined by the county committee to be necessary for successful establishment of the practice. When fertilizer is required, the requirements shall be based on an approved soil test showing minimum requirements for successful establishment of the cover, except that in the event such a soil test cannot be supplied or obtained in time to permit the orderly accomplishment of the practice, fertilizer requirements based on the recognized local agronomic recommendations derived from soil tests of similar soils in the county may be established by the group responsible for formulating the county program. If fertilizer is required, it shall be applied prior to or during the seeding operation.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations. A good stand and good growth must be obtained in sufficient time to protect the area in the fall and winter of 1964.

All seed used must be seeded within the applicable period shown in the county handbook.

Volunteer or naturally reseeded stands do not qualify for cost-sharing. Pasturing consistent with good farm management is permitted but none of the growth may be harvested for hay, silage, grain, or seed. Where materials used in carrying out the practice were purchased other than under purchase order as CMS, purchase invoices must be furnished showing the quantity and quality of materials purchased. Where homegrown seed was used, evidence must be furnished showing the quality of seed used and information satisfactory to the county committee must be furnished to indicate the quantity used.

D-2. Establishment of vegetative cover for summer protection from erosion.

LIMITATIONS.—This practice is not applicable to land on which there is an existing vegetative cover of perennial grasses and/or perennial legumes.

FEDERAL COST-SHARE:

Seedings	Per-acre seeding rate (pounds)	Federal cost-share per pound
a. Annual lespedeza ¹	20-35 { Kobe	\$0.08
	{ Other .....	.06
b. (Not used in 1964.)		
c. Sudangrass	25-35 .....	.06
d. Millet	20-30 .....	.05
e. (Not used in 1964.)		
f. Annual sweetclover	15-20 .....	.12

¹ The seeding rate and maximum cost-share rate are based on unhulled seed. County groups are authorized to establish separate seeding rates and cost-share rates for hulled seed. If this is done, the county handbook shall specify the minimum and maximum seeding rates and the cost-share rate for hulled seed. The seeding rate should be decreased approximately 25 percent from that for unhulled seed and the cost-share rate may be increased approximately 25 percent above that established for unhulled seed.

TECHNICAL RECOMMENDATIONS.—Where there is a deficiency of minerals in the soil, such as phosphorus, potash, or lime, these should be added prior to seeding and mixed with the soil before or during the seeding operation. If the crop is turned under, it should be followed by a fall-sown crop.

a. *Seedbed preparation.*—The seedbed should be prepared by breaking, plowing, or disking and, for lespedeza, should be firmed by dragging, cultipacking, or by being well settled by rain.

b. *Seeding.*—Lespedeza should be sown on top of a firm seedbed. Seedings at less than the lowest rate shown under the Federal cost-share for each seeding will not qualify for cost-sharing. Any seedings in excess of the highest specified rates will not increase the amount of cost-sharing for the practice. County handbooks shall specify the opening and closing dates for time of planting.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

A good stand and good growth must be obtained and left on the land or turned under. Volunteer or naturally reseeded stands will not qualify for cost-sharing. Crops may be pastured consistent with good farm management. None of the growth may be harvested for hay, silage, or seed. Where seed used in carrying out the practice was purchased other than under purchase order as CMS, purchase invoices must be furnished showing the quantity

and quality of seed purchased. Where homegrown seed was used, evidence must be furnished showing the quality of seed used and information satisfactory to the county committee must be furnished to indicate the quantity used.

CONSERVATION PRACTICES WITH LIMITED AREA APPLICABILITY

F. Practices To Meet Special County Conservation Needs

F-1. Special conservation practices. Consistent with the principles set forth in section 1, the county committee and designated representatives of the Soil Conservation Service and the Forest Service at the county level may recommend, and the State Committee and designated representatives of the Soil Conservation Service and the Forest Service at the State level may approve, for use in a county, one practice included in the National Bulletin for which there is need locally on a substantial number of farms but which is not selected for use in the State. Such approval shall be subject to review by the Deputy Administrator, as to compliance with the provisions of the National Bulletin.

MAXIMUM FEDERAL COST-SHARE: The percentage of the average cost of carrying out the practice as determined under the provisions of section 3, I.

F-2. County conservation practices. Consistent with the principles set forth in section 1, the Deputy Administrator, may approve for use in a county, one practice which is not included in the National Bulletin which is needed to meet particular conservation problems in the county. Such approval may be given only upon the recommendation of the State and county committees and designated representatives of the Soil Conservation Service and the Forest Service at both the county and State levels, and upon their finding (1) that the conservation problem exists on a substantial number of farms in the county, (2) that the practices contained in the National Bulletin will not provide adequate treatment of the problem, (3) that the proposed practice will adequately meet the problem, (4) that the proposed practice would not be performed without Federal cost-sharing, (5) that the proposed practice will provide the most enduring solution to the problem practicably attainable under existing circumstances, (6) that the proposed practice is one on which the offering of financial assistance is fully justified as being in the public interest, and (7) that the proposed practice meets the standards and requirements of comparable practices in the National Bulletin.

MAXIMUM FEDERAL COST-SHARE: The percentage of the average cost of carrying out the practice as determined under the provisions of section 3, I.

F-3. Practices to meet new conservation problems. Consistent with the principles set forth in section 1, the Deputy Administrator may approve for use in a county, practices for the treatment of critical conservation problems, primarily those which have arisen subsequent to the initiation of the program in the county. Such approval may be given only upon the recommendation of the State and county committees and designated representatives of the Soil Conservation Service and the Forest Service at both the county

and State levels, and upon their finding (1) that the conservation problem exists on a substantial number of farms in the county, (2) that the practices contained in the National Bulletin will not provide adequate treatment of the problem, (3) that the proposed practice will adequately meet the problem, (4) that the proposed practice would not be performed without Federal cost-sharing, (5) that the offering of Federal cost-sharing for the proposed practice is justified as within the scope of national conservation objectives, (6) that adequate facilities, including technical services, will be available to permit the practice to be carried out effectively, and (7) that treatment of the problem cannot be safely delayed until a subsequent program.

MAXIMUM FEDERAL COST-SHARE: The percentage of the average cost of carrying out the practice as determined under the provisions of section 3, I.

F-4. Emergency conservation measures to restore to productive use land damaged by natural disasters. This practice is applicable only in counties designated by the Secretary as counties in which wind erosion, floods, hurricanes, or other natural disasters have created new conservation problems which (1) if not treated will impair or endanger the land, (2) materially affect the productive capacity of the land, (3) represent damage which is unusual in character and, except for wind erosion, is not of the type which would recur frequently in the same area, and (4) will be so costly to rehabilitate that Federal assistance is required to return the land to productive agricultural use.

Emergency conservation practices may be approved by the Deputy Administrator upon recommendation by the State and county committees and designated representatives of the Soil Conservation Service and Forest Service at both the State and county levels. Eligible measures shall be specified in the wording of the practice as approved for use in the county. Cost-sharing may be offered under this practice only for replacing a practice or restoring the land to its normal productive capacity and may not be offered for the solution of conservation problems existing prior to the disaster involved.

The cost-share computed for any person for this practice shall not be increased in accordance with section 6, D and shall not be included with the cost-shares computed for such person for other practices in applying the maximum Federal cost-share limitation in section 6, E. The total of all Federal cost-shares for this practice to any person with respect to farms in any one county shall not exceed the sum of \$2,500, except that, with the written prior approval of the State Committee, a higher maximum may be approved in individual cases upon justification by the farmer on the basis of exceptional need and his inability to otherwise carry out the work.

Costs for this practice will be shared only for eligible measures carried out during the period July 1, 1963, to December 31, 1964, inclusive, and only if cost-sharing is requested by the farm operator within 30 days after the practice is approved for use in the county or before the date on which performance of the eligible measures is started, whichever is the later.

With the approval of the county committee, costs of performing this practice may be shared with farmers who carry out eligible measures on their lands or, with the permission of the owners or operators of adjacent or nearby lands, on such adjacent or nearby lands.

MAXIMUM FEDERAL COST-SHARE: The percentage of the average cost of carrying out the practice as determined under the provisions of section 3, I.

CONSERVATION PRACTICES WITH BENEFITS PRIMARILY TO WILDLIFE

G. Wildlife Practices With Soil and Water Conservation Benefits.

G-1. Establishment of Vegetative Cover Providing Wildlife Food Plots and Habitat.

LIMITATIONS.—With the exception of plantings for doves and geese, each planting to provide food must be adjacent to woodlands, thickets, wooded fence rows or lanes, or other similar permanent wildlife cover. The area devoted to the planting must be at least one-fourth acre in size, and shall not be less than 33 feet ($\frac{1}{2}$ chain) in width.

FEDERAL COST-SHARE:

a. Seedbed preparation—\$2.50 per acre

b. Seeding:

<i>Plant</i>	<i>Per Acre Seeding Rate (pounds)</i>	<i>Federal Cost-Share per pound</i>
1. Annual lespedeza	20-35 { Kobe	\$0.08
	{ Other .....	.06
2. Lespedeza sericea	25-50 .....	.08
and annual lespedeza	20-35 { Kobe .....	.08
	{ Other .....	.06
3. Bush lespedeza .....	.....	.001 per plant
(planted 2 feet apart in rows approximately 3 feet apart, with a minimum planting of 1,200 plants)		
4. Reseeding crimson clover	15-20 .....	.14
5. Tall fescue	12-20 .....	.15
(Alta or Ky. 31)		
6. Rye, and	84-112 .....	.02
reseeding crimson clover	15-20 .....	.14
7. Tall fescue	12-20 .....	.15
(Alta or Ky. 31)		
and white or ladino clover	1-2 .....	.42
8. Ryegrass	25-35 .....	.05
9. Browntop millet	20-30 .....	.05
10. Browntop millet	20-30 .....	.05
and cowpeas (only		
red ripper, combine,	90-120 { (broadcast) } .....	.03
clay, or Bradham)	40-60 { (in rows) }	
11. White or ladino clover	1-2 .....	.42
12. Bahiagrass	15-20 .....	.13
13. Oats	96-128 .....	.02
or Browntop millet	10-15 .....	.05
and any adapted		
perennial planting	(same rate as shown above for the perennial)	(same rate as shown above for the perennial)
14. Multiflora rose	Plant approximately 18-24 inches apart in the row	.002 per plant
(where needed as a cover strip with other plantings)		

c. Lime—The maximum Federal cost-share shall be 50 percent of the average cost of the materials, not to exceed \$3.25 per ton of lime needed. (See section 3, F, for determination of quantity required.) County handbooks shall state a specific monetary rate of cost-sharing per ton.

d. Fertilizer—\$0.045 per pound of available plant food. (See section 3, F, for determination of quantity required.)

TECHNICAL RECOMMENDATIONS AND REQUIREMENTS.—The plantings used shall be those recommended as adapted to the area and to the soils where the plantings are to be established. Where a cover strip is needed, part 14 under seeding in the Federal cost-share statement shall be used in connection with the strip.

a. *Type of Cover.*—The seeding or combination of seedings to be used should be that most beneficial to the species of wildlife for which the area is being developed. The following are recommended:

(1) *For Quail.*—Annual lespedeza; mixture of lespedeza sericea and annual lespedeza; bush lespedeza; or browntop millet and cowpeas. Either oats, or millet adjacent to perennial plantings, is recommended.

(2) *For Rabbits.*—Annual lespedeza; mixture of lespedeza sericea and annual lespedeza; reseeding crimson clover; white or ladino clover; tall fescue; or lespedeza sericea.

(3) *For Deer.*—White or ladino clover; reseeding crimson clover; or tall fescue.

(4) *For Turkey.*—White or ladino clover; reseeding crimson clover; or Bahiagrass. Oats or millet are recommended in connection with the perennial plantings.

(5) *For Doves.*—Browntop millet.

(6) *For Geese.*—Rye and reseeding crimson clover; tall fescue and white clover or ladino clover; ryegrass; or white or ladino clover.

b. *Seedbed Preparation.*—The seedbed should be prepared by thoroughly breaking, plowing, or disking, and firmed by dragging, or cultipacking, or by being well settled by rain.

c. *Seeding.*—The seed should be sown on a firm seedbed and covered lightly. Seedings at less than the lowest rate specified under part "b" under Federal cost-share will not qualify the area for cost-sharing. County handbooks will specify opening and closing dates for time of planting and, where necessary, the sequence of overseeding when the mixture chosen includes overseeding.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner, and in accordance with the technical requirements and practice limitations.

The growth may not be harvested for seed, grain, hay, or silage, or otherwise managed in a manner which will adversely affect the wildlife for which the area is being developed. Where materials used in carrying out the practice were purchased other than under purchase order as CMS, purchase invoices must be furnished showing the quantity and quality of materials purchased. Where home-grown seed was used, evidence must be furnished showing the quality of seed used and information satisfactory to the county committee must be furnished to indicate the quantity used.

G-2. Development of Shallow Water Area for Wild Ducks

(The Soil Conservation Service has technical responsibility for structures required under this practice.)

LIMITATIONS.—This practice is applicable only to farmland which is suitably located and adapted to development of shallow water areas for wild ducks. Federal cost-sharing for plantings under this practice shall be limited to plantings within the floodable area

and plantings on any embankments constructed. Costs will not be shared for performance of one component of this practice unless the other needed components are also performed. Component "c" under Federal cost-sharing is not applicable to developments occupied by a stand of green trees.

FEDERAL COST-SHARE:

- a. Construction of dams or embankments—\$.08 per cubic yard of earth moved not to exceed \$160 per development.
- b. \$25 for pipe for draining pond. (Federal cost-sharing is limited to installations which meet the requirements of part "c" under Technical Recommendations.)
- c. Establishment of food producing plants.
 1. Seedbed preparation—\$2.50 per acre
 2. Seeding:

Plant	Per Acre Seeding Rate (pounds)	Federal Cost-Share Per Pound
(a) Browntop millet	20-30	\$.05
(b) Milo	{ 20-25 (drilled) 25-35 (broadcast)	.05
(c) Jap millet (not recommended in rice area)	20-30	.05
(d) Corn	6-10	.10
(e) Corn	6-10	.10
and Browntop millet	20-30	.05

Required Seeding Period:

Browntop millet	June 20-July 15
Milo	July 1-August 15
Jap millet	June 20-July 15
Corn	May 1-June 1

TECHNICAL RECOMMENDATIONS AND REQUIREMENTS.—a. *Water Supply.*—A water supply should be available in such quantity that the pond can be flooded to the planned depth in a reasonable length of time. Area should be flooded about November 1.

b. *Depth of Water.*—The pond should be so constructed that a minimum depth of 6 inches of water can be maintained when needed. The maximum average depth of water must not exceed 2.0 feet.

c. *Drainage.*—A drain pipe must be installed for draining the pond to facilitate maintenance and to permit the establishment of food producing plants. Pipe used must be placed through the fill in accordance with plans and specifications which specify the size of pipe, number and location of antiseep collars where needed, and the elevation at which the pipe shall be located. The fill material should be thoroughly compacted around the pipe to prevent seepage. Metal pipe must be coated, or painted with asphalt or other preservative material, prior to installation. Other pipe of materials such as reinforced concrete or asbestos cement may be used, provided watertight joints are used, and provided the pipeline is embedded in concrete when the height of the fill necessitates additional structural strength.

d. *Pond Construction.*—(1) *Top width.*—For fill height of 4 feet or less, the top width must not be less than 4 feet. For fill heights of over 4 feet, the top width must not be less than 6 feet.

(2) *Freeboard.*—The lowest point along the top of the settled fill must be at least 2 feet higher than the planned water surface, except that on green-tree ponds when maximum water depth is

less than 3 feet this height may be reduced to one foot. An overflow facility may be desirable to help maintain the freeboard.

(3) Side slopes.—(a) Slopes.—The side slopes of the fill should not be steeper than 3 to 1 on the inside and 2 to 1 on the outside, calculated on a settled basis, except (1) that where existing fills which are not eroding are used as outside slopes they need not be reworked; or (2) that on developments occupied by a stand of green trees with fill heights of less than 4 feet $1\frac{1}{2}$ to 1 slopes will be acceptable.

(b) Protection of fill against erosion.—The entire outside slope and the inside slope above the planned waterline should be seeded or sodded to perennial vegetation. On ponds where wave action may cause excessive erosion or overtopping of the fill, crown widths should be widened and/or the freeboard increased in height to take care of expected wave action.

(4) Settlement.—The allowance for settlement will be at least 10 percent. This will be increased to at least 15 percent for dams constructed with bulldozers, and to at least 20 percent for dams constructed with draglines.

(5) Berm.—The berm may be variable. Where a fill is constructed adjacent to a borrow pit and side slopes of the excavation are steeper than 2.5 to 1, the minimum width between the toe of the fill and base of excavation must be at least 2.5 times the depth of the excavation.

(6) Foundation preparation.—The entire base of the fill must be cleaned of all trees, stumps, limbs, and roots, so that an adequate bond will be obtained between the fill and the base. This material must be pushed outside of the limits of the base of the fill. The upper layer of topsoil should be stockpiled and spread over the completed fill to help in getting vegetation established. Where permeable soil material is encountered, a core trench must be excavated at least 4 feet wide and deep enough to penetrate impervious material. Steep banks of gullies, streams, etc., must be sloped so that they are not steeper than 2 to 1 for the base width of the fill.

Earth moved in constructing the core trench will be considered as earth moved in construction of the pond.

(7) Construction requirements.—The fill material shall be placed in such manner that percolation of water through the fill will be held to a minimum.

e. *Establishment of Food Producing Plants.*—(1) *Seedbed preparation.*—The seedbed should be prepared by thoroughly breaking, plowing, or disking, and firmed by dragging, or cultipacking, or by being well settled by rain.

(2) *Seeding.*—The seed should be sown on a firm seedbed and covered lightly. Where conditions permit, browntop millet and Jap millet may be broadcast on mud flats. Seedings at less than the lowest rate specified under part "c" of Federal cost-share will not qualify the area for cost-sharing. Seeding must be done within the seeding period specified above.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner, and in accordance with the technical requirements and practice limitations. Crops produced in connection with the establishment of this practice are not to be grazed, harvested for hay, silage, grain or seed. Crops may not be dragged down or

otherwise handled in a manner contrary to Federal or State regulations applicable to migratory birds.

Where seed or other materials used in carrying out the seeding part of the practice were purchased other than under purchase order as CMS, purchase invoices must be furnished showing the quantity and quality of seed or other materials purchased. Where home-grown seed was used, evidence must be furnished showing the quality of seed used and information satisfactory to the county committee must be furnished to indicate the quantity used.

G-3. Constructing Ponds for Fish

(The Soil Conservation Service has technical responsibility for this practice.)

LIMITATIONS.—This practice is applicable only to permanent ponds or dams for fish constructed on farmland. No Federal cost-sharing will be allowed for ponds or dams which will impound water on areas which will be drained periodically for the production of crops or for dams or ponds which are primarily for the commercial production of fish or other wildlife for food.

FEDERAL COST-SHARE:

- a. 8 cents per cubic yard of earth moved, not to exceed \$160 per pond.
- b. Drop inlets, if needed—(Federal cost-sharing under this provision is limited to installations cited in paragraph 1(2) of the technical recommendations for ponds with outside drainage area (see practice B-7) and in paragraph a, 4, of the technical recommendations for reservoir type ponds):

Pipe (diameter in inches)	Per linear foot
(1) 6	\$0.50
(2) 8	.75
(3) 10	.90
(4) 12	1.00
(5) 14	1.15
(6) 15	1.20
(7) 16	1.25
(8) 18	1.40
(9) 20	1.55
(10) 21	1.60
(11) 24	1.85
(12) 30	2.25
(13) 36 or over	2.70
c. Antiseep collars	.63 sq. ft.

TECHNICAL RECOMMENDATIONS.—a. Reservoir-Type Ponds.—

(1) Water Supply.—(a) Source.—Wells are a desirable source of water for the ponds; however, any available source may be used. Where the source of supply contains wild fish, a filter of sufficient capacity to filter the entire supply should be used. An alternate method of eliminating wild fish from ponds is to use an accepted fish toxicant after the ponds are filled. Check water for toxicity by placing fish in a minnow bucket in the pond before stocking.

(b) Quantity.—The supply should be sufficient to increase the depth of water at the time of filling at such a rate as to prevent the establishment of noxious weeds, and must be such that the normal water level in the pond can be maintained during any season of the year. A supply of five gallons per minute per acre of surface area is approximately the amount of water needed to offset water losses by seepage and evaporation in ponds during the drier seasons of the year. Ponds should have a minimum surface area of one-half acre.

(2) Depth of Water.—The area considered feasible for fish production and control of noxious plant growths must be not less than 18 inches in depth; 36 inches is recommended.

(3) Soils.—Ponds should be constructed only in those soils that are known to retain water without excessive seepage.

(4) Drainage.—Pipe with necessary flash board risers, water gates, or other controls for draining the pond and controlling the water level is required. The pipe size should be adequate to drain the pond or lower the water level when necessary within a relatively short time.

Pipe used must be placed through the fill in accordance with plans and specifications which specify the size of pipe, number and location of antiseep collars when needed, and the elevation at which the pipe shall be located. The fill material should be thoroughly compacted around the pipe to prevent seepage. Metal pipe must be coated or painted with asphalt or other preservative material prior to installation. Other type of materials such as reinforced concrete or asbestos cement may be used provided watertight joints are used, and provided the pipeline is embedded in concrete when the height of the fill necessitates additional strength.

Federal cost-sharing may be approved for the required drop inlets and antiseep collars. To be eligible for Federal cost-sharing, the drop inlet and antiseep collars must meet the specifications, technical requirements, and performance requirements of practice C-7.

(5) Pond Construction.—(a) Top width of levee.—The minimum top width must not be less than indicated below:

<i>Height of Fill Above Normal Ground Level</i>	<i>Top Width</i>
6 feet or less	6 feet
Over 6.0 feet but not over 11.0 feet	8 feet
Over 11.0 feet but not over 15.0 feet	10 feet

Except that on ponds of 1 acre surface area or less, and fill heights not exceeding 4 feet, a top width of 4 feet will be acceptable.

(b) Freeboard.—The lowest point along the top of the settled fill should be at least 2 feet higher than the planned water surface in the pond, except that where the surface area of the pond is one acre or less, a freeboard of one foot will be acceptable. An overflow facility may be desirable to help maintain the freeboard.

(c) Side slope.—1. Minimum slopes.—a. Ponds where the surface area does not exceed 1 acre: The side slopes of the fill should not be steeper than 2 to 1, calculated on a settled basis.

b. Ponds where the surface area exceeds 1 acre: The side slopes of the fill should not be steeper than 2 to 1 on the outside, and 3 to 1 on the inside calculated on a settled basis.

Existing banks on outside slopes that are not eroding need not be reworked.

2. Slope protection.—The entire outside slope of the fill and the inside slope above the waterline should be seeded or sodded to perennial vegetation.

3. Protection from wave damage.—Where the surface area of the pond exceeds 5 acres, the fill must be protected from wave damage by increasing the width through the dam at the planned waterline elevation, a minimum of 4 feet. This increase in width may be obtained by increasing the crown width and/or freeboard height,

or by a reduction in the steepness of side slopes. Any exception to these requirements must be approved by an engineer who has authority to approve such plans.

(d) Settlement.—Allowance for settlement will be at least 10 percent, except that this will be increased to at least 15 percent for fills constructed with bulldozers and to at least 20 percent for fills constructed with draglines. Where a combination of equipment is used, the type of equipment having the higher percentage factor will be used.

(e) Berms.—Berms may be variable. Where a fill is constructed adjacent to a borrow pit and side slopes of the excavation are steeper than 2.5 to 1, the minimum distance between the toe of the fill and base of the excavation must be at least 2.5 times the depth of excavation.

(f) Foundation preparation.—The entire base of the fill must be cleared of all trees, stumps, limbs, and roots so that an adequate bond will be obtained between the fill and the base. This material must be pushed outside the limits of the base of the fill. The upper layer of topsoil should be stockpiled and spread over the completed fill to help in getting vegetation established. Where permeable soil material is encountered, a core trench must be excavated at least 4 feet wide and deep enough to penetrate impervious material. The banks of gullies, streams, etc., must be sloped so that they are not steeper than 2 to 1 for the base width of the fill.

Earth moved in constructing the core trench will be considered as earth moved in construction of the pond.

(g) Borrow pits.—Inside borrow pits should be smooth with minimum side slopes of 1 to 1.

(h) Construction requirements.—The fill material will be obtained from selected borrow areas meeting the approval of the technician. The material shall be placed in such a manner that percolation through the fill will be held to a minimum.

Where there is variation in fill material, the more impermeable material will be used in the core, and the inside portion of the fill; less desirable material in outside portion.

b. *Ponds with Outside Drainage Area (Hill Land Type Ponds).*—The technical recommendations in practice B-7 apply to ponds with outside drainage area with the following additions or modifications:

(1) The surface area of the pond should be a minimum of one-half acre.

(2) On ponds with depths of 10 feet or more a cold water release in connection with a trickle tube (drop inlet) must be provided to facilitate fish management.

(3) References in practice B-7 to excavated reservoirs, "damless tanks", or dugout ponds are not applicable to this practice.

(4) Reference in practice B-7 to installation of a pipe to supply water to watering troughs is not applicable to this practice.

PERFORMANCE.—The practice must have been carried out in a workmanlike manner and in accordance with the technical requirements and practice limitations.

The operator, or other person sharing in the practice, must notify the county committee when the earthwork of the structure has been completed in order that a performance check may be made.

